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AN INTRODUCTION TO FIVE PAPERS ON THE ARCHAIC STAGE

DOUGLAS S. BYERS*

Archaic (är-ka'ik) *adj.* [Gr. *archaikos*, old fashioned, fr. *archaios*, ancient]. 1. Belonging to or having the characteristics of an earlier, more primitive time; old fashioned or antiquated. . . . 3. Of objects or art, belonging to an early conventional stage, but of too advanced a style to be called primitive, as the Greek art of the 6th century B.C. . . . .

Webster's New International Dictionary, Second Edition, Unabridged. C. & G. Merriam Co., Springfield, 1953.

THE WORD "archaic" appears in the literature of New World archaeology with more than one usage. In 1910, the existence of three levels of human remains was demonstrated in the Valley of Mexico. The lowest level, in which well-developed ceramics were included, was characterized by hand-modeled human figurines in contrast to the mold made ones of Toltec and Aztec horizons. The civilization of the lowest level came to be called "the archaic type" (Boas 1915). Tozzer (1916: 466), in a paper presented at the Pan American Scientific Congress, Washington, 1915, noted that the terms "*tipo de cerro*" and "*tipo de montaña*" had also been used, and suggested that "Archaic" was a more fitting term. This term was also used by Spinden (1915, 1917a, 1917b) and given its widest circulation in this sense in connection with his theory that the Archaic people were of Nahua stock, that they could be traced by handmade figurines and modeled additions to ceramic vessels, that they were in some degree responsible for the spread of agriculture, and that they laid the foundation for higher cultures in what is now called Nuclear America.

The present papers are not concerned with the erstwhile "Archaic" of Middle America, now assigned to the Formative stage (Willey and Phillips 1955: 766), but with an entirely different series of cultures in North America of a much more primitive order. Inevitably confusion between the two usages of the term will arise unless proper qualification is made. Note that usage of the term "archaic" in North American archaeology developed along lines that in part parallel its usage in Mesoamerica.

"Archaic" first appeared in the literature of North American archaeology as the designation of a particular class of archaeological remains when Ritchie (1932a) applied the term to the Lamoka site. Under the influence of Parker and Skinner, he believed at that time that the Algonkin occupation of New York could be divided into successive periods. Skinner (1919, 1920) used the word "archaic" as an adjective in referring to archaic forms of arrow points and archaic styles of Algonkin pottery. Parker (1920:48-9) set up three hypothetical Algonkin cultural stages on the basis of a jumble of traits selected from collected specimens. None of the cultural units so ably demonstrated by Ritchie's excavated sites coincides with any stage outlined by Parker. In a later scheme, Parker (1923) divided the Algonkin remains into four *cultural stages*. Under the heading "Periods of Occupation" he discussed the "archaic stage" (continuing Skinner's usage as a simple adjective) followed by secondary, third, and fourth stages. In this paper Parker states that sites of the archaic stage will be recognized by an absence of pottery — this was included in his earliest stage in 1920 — and by the presence of quantities of netsinkers, choppers formed from naturally flattened stones, hammerstones, steatite vessels, rude tools of cherty flakes, together with large and clumsy arrow points or an occasional fine spearhead. It is interesting to observe that while Ritchie records sinkers and choppers from sites in New York which are in his Archaic, other traits in Parker's list are said never to occur on such sites.

* [The Editor expresses his appreciation to Douglas S. Byers for assembling these papers and preparing them for publication.]

The term was first used in capitalized form by Ritchie (1932a) when he referred to "Archaic," "Archaic Algonkin," and "Archaic Algonkin Period." This paper was followed almost immediately by the report on the Lamoka site (1932b) which listed in greater detail the traits which distinguished the Archaic: use of "the beveled adz; narrow-bladed, notched arrowpoint, and the pendant-like antler objects." He further noted that other sites in the Genesee Valley had yielded a similar stone industry, and that none of these sites produced pottery. In 1936, in accordance with the terminology of the Midwest Taxonomic System (sometimes called "the McKern Classification") Ritchie (1936: 18) established the Archaic pattern on the basis of Archaic Algonkin, with one focus, the Lamoka, comprised of the three components then known—Lamoka Lake, Scottsville (Woodchuck Hill), and Geneva. A fourth, Avon, was also known at that time, but is not named. Diagnostic traits included the beveled adz; chopper; chipped points for javelins, spears, and arrows characterized by narrow blades and straight or notched stem; and pendant-like artifacts of antler. No other positive diagnostic traits could be distinguished at that time, but emphasis was placed on the importance of "negative" traits, including the absence of evidence of horticulture, pottery, steatite, the smoking pipe, barbed harpoons, objects of native copper or of shell, gorget, birdstone, bannerstone, grooved ax, and gouge. At that time Ritchie envisaged the possibility that other phases or aspects of the Archaic pattern might be demonstrated by further work on other preceramic and prehorticultural sites.

By 1938, Ritchie had identified the Laurentian aspect, then assigned to the Woodland pattern, but he made no changes in either positive or negative traits for the Archaic pattern and the Lamoka focus. He stated, however, that: "Chiefly on typological considerations, the Lamoka Focus appears to be the oldest known culture of the Northeast, and without doubt it may be arrayed beside the Laurentian, which it may temporally overlap, as one of the specific and significant of the older complexes of the area" (Ritchie 1938: 108). The Archaic pattern had thus acquired the aura of antiquity to which W. H. Sears (1948) has drawn attention.

It is clear that the concept of an Archaic pattern grew very gradually from a rather simple beginning in New York. What began as an archaic *stage of culture* became gradually transmuted into an Archaic *pattern*. At that time, Ritchie distinguished his Archaic *period* from the second and subsequent periods in New York on the basis of absence of certain classes of artifacts that were customarily associated with those later divisions, as well as by the presence of certain forms which were not found in the later periods. This may have been perfectly satisfactory in a strictly local analysis; when an attempt was made to set up a framework which theoretically could be applied on a continent-wide basis, the value of the negative traits became open to question.

With the expansion of archaeological salvage work under CWA, PWA, WPA, TVA, and other agencies, knowledge of archaeological expressions of other relatively simple cultures began to accumulate. These are covered by the work of Webb (1939, 1946, 1950a, 1950b), Webb and Haag (1939, 1940, 1947), Webb and DeJarnette (1942, 1948a, 1948b, 1948c), Webb and Wilder (1951), Lewis and Kneberg (1947) and others, some of whose reports have not been published. Material covered by these authors is of the familiar Kentucky "Shell-mound Archaic" expression. The work of Guernsey (1937) uncovered material similar to that from Kentucky on the Indiana side of the Ohio River. Claflin (1931) had previously dug in a mound on Stalling's Island; as later information accumulated (Fairbanks 1942), it was seen that the lowest part of the deposit at Stalling's Island contained material reminiscent of some discovered in Kentucky and Tennessee.

In 1939, Webb and Haag did not assign Chiggerville to the Archaic pattern, although at the present time the collection from that site would probably be classified as "Archaic" without much question. In 1940 they "hesitatingly" assigned the Ward and Kirkland sites to the Archaic on the basis of collections similar to that recovered at Chiggerville (Webb and Haag 1940: 109). At least one of the authors was not too certain of this classification. Even after Webb and DeJarnette (1942) had completed and sent to press the report on the Pickwick Basin, in which they summarized the Pickwick aspect of the Archaic pattern, with its constituent Lauderdale and Indian Knoll foci, Haag (1942: 214) saw fit to issue a word of warning. He cautioned that much work remained to be done before it would be safe to

define accurately traits which could be used in determining foci, aspects, and phases.

> The designation of traits of these various orders, i.e., focus, aspect, and phase, are not to be matters of judgement but rather naturally manifest, statistically substantiated, cultural items. This position or state of knowledge is probably a good many years in the future. Nor are we really prepared to assign this group of related materials to a pattern, although the author and W. S. Webb "hesitatingly" did so in 1940. That designation, the Archaic, may prove to be correct.

Others were not to heed Haag's admonition, and soon every site in the East that lacked evidence of ceramics or horticulture was being assigned to "the Archaic." The rather limited space available within the framework of Ritchie's diagnostic traits proved to be too cramped for cultural expressions of the Southeast and Mississippi Valley. Instead of setting up new phases (McKernian) where there was most certainly ample reason to do so, authors crammed their material into a veritable Procrustean bed. Without doubt the absence of pottery and of any tangible evidence of horticulture from these sites was the factor which led those who described the material culture to place sites in "the Archaic."

W. H. Sears (1948) drew attention to the muddled state of affairs at the time when he wrote. This condition arose not only as the result of the unsystematic addition of new units to a framework that was never designed to take them in the first place, but also, in part as the result of occasional outbursts of iconoclasm. For example, Griffin (1946: 40-43, Figs. 1-3) not only inveighed against current classifications which to him seemed fallacious, but further compounded confusion by lumping sites then placed in "the Archaic" along with "Folsom" and "Yuma" in what he termed "Paleo-Indian." Fortunately this effort at clarification did little to further muddy the waters.

Sears directed his criticism of "the Archaic" at a formulation that appeared to him to be unsound. Many of his comments are completely valid, but in part he appears to have been tilting at windmills. Ritchie (1944: 319 and following) makes it clear that he still is concerned with *the archaic level* (italics are mine) in his discussion of the Lamoka focus, the Laurentian aspect, and other manifestations of this same order in the Southeast. However, there can be no doubt that Ritchie (1944: 235-309) made unqualified use of the concept of the Archaic pattern in his discussion of the material from New York and adjacent areas. Webb and DeJarnette (1942: 319) applied the term "Archaic" to the early, semisedentary, hunting-fishing people whose remains have been found in the Southeast. Fairbanks (1942) did not place Stalling's Island and the other southeastern sites which he discussed in "the Archaic" along with the Lamoka focus and the Laurentian aspect, but he drew attention to similarities in economy. Lewis and Kneberg (1947) definitely did assign their sites to the Archaic pattern. As Sears has pointed out, the specific traits that Ritchie used as diagnostics of the New York Archaic were of no value in the Southeast. Some sites, such as Stalling's Island, even yielded primitive forms of pottery. Inclusion of remains of the latter class invalidated the stricture that sites must be nonceramic.

Sears was restating in more detail, and somewhat more emphatically, a condition to which Johnson (1937) had drawn attention ten years before — it was possible to find a given complex of stone implements either with or without pottery. When a fundamental criterion by which the Archaic pattern could be recognized was lack of pottery, and when other criteria such as absence of evidence of horticulture and indications of age appeared not to carry great validity, there was little to distinguish the Archaic pattern from the Woodland pattern save presence or absence of ceramics. It was Sears' contention that there was still a valid connection to be found on the pattern level, even though he disposed of all the criteria which Ritchie had established, but he felt it important that people recognize the fact that the sites then classified as Archaic were in effect only expressions of the Woodland continuum, and to be distinguished from Woodland sites only by the absence of pottery. Nevertheless, sites which showed no evidence of horticulture and which produced no potsherds were still assigned, almost automatically, to "the Archaic."

In time, archaeologists began to realize the continent-wide distribution of remains of people who appear to have been hunters and gatherers possessed of a culture that was more or less parallel to that represented in Archaic sites in the Southeast. Haag (1942: 221) pointed out the similarities between remains of the hunter-gatherers of the Southeast and those of California. Beardsley (1948) reinforced this observation with a much larger list of similarities be-

tween archaeological remains of central California and those of the rest of the continent. Kelley (1947a) considered the Balcones phase an expression of "an archaic cultural pattern." In rapid succession a number of papers reported remains of cultures of this general character from the Plains (Holder and Wike 1949), Illinois (MacNeish 1948), Louisiana (C. H. Webb 1948) and the Ozarks (Baerreis 1951). The literature is too extensive to be briefed here. A glance at the bibliographies published with these few titles will demonstrate the rapid increase in the number of papers in this field.

By and large most of these papers were concerned with the reporting of new sites, and slight effort was devoted to gaining an over-all view of the field. Although Webb and DeJarnette (1948a) made an attempt to put order into sites along the Tennessee River by arranging Archaic and Woodland sites in six sequent time zones, the interest of most writers was chiefly in the gathering of new information. No one yet made an attempt at analysis, collation, and the ordering of the rapidly expanding body of data.

Few people had yet perceived the possibility that divergences among sites and regional variations of Archaic cultures might be resolved by regarding the Archaic as a cultural stage, spread across the continent and modified by environmental conditions to which response was made in a way best suited to meeting local problems of subsistence.

The confusion became so great that an attempt was made to hold an Archaic Conference — a work session at which such problems could be discussed — before the opening of the meetings of the Society for American Archaeology at Bloomington, Indiana, in 1955. A beginning was made, but the subject was too extensive to cover in one session. Subsequent correspondence and discussions among persons working with hunting-gathering cultures helped to clarify the subject. From this beginning, the succeeding five papers were developed.

At a time when geological as well as archaeological structures are crumbling before each new salvo of dates from radiocarbon laboratories, it may appear temerarious to offer these papers. To refrain from presenting them because of the possibility that new data will require radical revision of theories here expressed would be to smother and conceal a very real part of American archaeology. Already the outlines of a new structure are beginning to take form. We see that the prehistory of man in the New World is far longer than anyone would have dreamed 25 years ago. Dimly we can see a vista stretching so far into the past that it offers an opportunity for the growth of primitive cultures from the crudest beginnings. It appears possible that we shall have to push the first occupation of the New World by man back to Early Wisconsin time, to a period when man, so far as we now know, had learned the use of fire and the trick of making stone implements of simple form, but had not made much progress along the road toward conquest of his environment. The Archaic stage is but one step in man's upward climb: some never reached it; others were content to rest on its broad base; while still others restlessly struggled on.

With a few exceptions, principally on charts which were not prepared in the editor's office, radiocarbon dates which appear in these papers have been translated into terms of the Christian calendar by the subtraction of 1950 years from the count of radiocarbon years. Dates not converted are clearly indicated in terms of years Before Present. Figures which appear in parentheses in the text refer to sample number. In cases in which no sample number appears after a date, that date had not been published at the time when these papers were assembled.

All numbers preceded by a C- (for example, C-302) refer to samples run at the Institute for Nuclear Studies, University of Chicago, under the direction of Willard F. Libby. These dates have appeared in Arnold and Libby 1950, 1951; Johnson 1951; Libby 1951, 1952, 1954a, 1954b, 1955. For complete data consult Libby (1955) which contains all age determinations processed by the Chicago laboratory. Specific citations for these dates are not given.

Numbers preceded by an L- refer to samples run at the Lamont Geological Observatory, Columbia University. These dates have been released in Kulp, Feely, and Tryon 1951; Kulp and others 1952; Broecker, Kulp, and Tucek 1956.

Numbers preceded by an M- designate samples run at the radiocarbon laboratory of the University of Michigan Memorial Phoenix Project. Unless otherwise noted, dates cited in these papers appear in the list published by Crane (1956). Except for the few dates not in this list, no specific citations will be given for Michigan dates.

Samples of the O- series were processed by the geochemical research group of the Production Research Division, Humble Oil and Refining Company (Brannon and others 1957). They will be identified by number only.

Samples with a W- prefix are U. S. Geological Survey dates for which references to Suess (1954) or Rubin and Suess (1955) are given in each case.

ROBERT S. PEABODY FOUNDATION
Andover, Mass.
April, 1957

THE EASTERN ARCHAIC: SOME PROBLEMS AND HYPOTHESES

DOUGLAS S. BYERS

UNRAVELING an archaeological problem has often been compared to the solution of a crime, differing from the latter in the coldness of the trail. The "whodunit" detective approaches omniscience; the archaeologist can only hope for a small degree of information about the material clues to his case. It might be more apt to compare the archaeologic process in the Northeast to an attempt to find out what went into the hash, for scraps of leftovers are all too frequently the only remains of many obliterated northeastern sites.

Nowhere are the limitations of archaeology more apparent than in the field of the "simpler" cultures whose perishable remains have vanished into mold. In the case of the Archaic cultures with which we are dealing, this is particularly true, for commonly all that remain are stone tools — often only the primary tools which fashioned the much more revealing implements of everyday life. If one may judge from the possessions of known primitive peoples, such as the Ona and Yahgan, the Seri, the Paiute and other gatherers of the Basin, perishable artifacts probably formed the greater part of a material culture rich in objects of basketry, wood, bark, hide, furs, feathers, or fiber. Imperishable traces of such gatherers would not be especially conspicuous.

We note in passing that during the infancy and adolescence of American archaeology, large collections of objects were made at sites that would produce showy collections to satisfy patrons and museum directors. More modest Archaic sites which, with some notable exceptions, tempted neither treasure hunters nor museums, remained very largely unknown until comparatively recently, and suffered severely from expansion of settlements and industry. It is a sad fact that along the Atlantic seaboard Archaic sites of great importance have been lost while attention turned to greener fields.

In this paper we shall review very briefly some of the limitations which have affected archaeological thinking and have hindered recognition of parallels among prehistoric societies, sometimes continent-wide in scope, such as is envisioned in the concept of the Archaic stage. We shall proceed to examine remains of Archaic cultures in the Northeast, particularly along the northern Atlantic slope, and attempt to sort out elements which blended in bewildering variations, the better to understand the roots of northeastern Archaic cultures.

PROBLEMS

Factual information about the archaeologic column in large parts of the country, particularly the Northeast, is based on excavated stations spaced hundreds of miles apart. For links between such sites it is necessary to rely on isolated finds in intermediate regions. Such collections, which often boast a very small number of specimens, become keystones in reconstructions of prehistory. Willoughby's *Antiquities of the New England Indians* was largely built on such foundations. Adequate and closely-spaced samples are the exception rather than the rule, and structures which are not based on such a series are decidedly vulnerable, and subject to alterations, often of a radical nature, as new information appears. The Vine Valley aspect, as originally proposed, with its loosely-knit Middlesex focus, is an example of a structure which has been much modified as additional information has been amassed, yet it still remains unclear.

Another limitation on archaeological processes lies in the inherent bias of the investigator which inclines him to judge other archaeological discoveries in terms of his own. This is but natural, for we are prone to become wrapped in our own problems and frequently operate on the premise that our particular area is the center from which parallel cultures originate. Only with recent increase in the body of data from excavated sites have archaeologists come to see outlines of a forest rather than the immediate shrub which confronts them.

Linking of chronology and stages of culture was once common practice. Without doubt the principle was sound when applied to any one province. For example, in the Mississippi drainage, successive steps from Archaic to Woodland to Mississippi have been outlined. In the same way, the Basketmaker-Pueblo sequence can be demonstrated in the Anasazi province. However, chronological-cultural divisions are not always valid away from the specific region in which they have been developed. The culture-stage chronology of the Anasazi area is by no means applicable throughout the Southwest;

on the Atlantic slope the culture-stage chronology of the Mississippi drainage most certainly does not apply. This is most evident to one who views the situation from a position on the "periphery." Then one sees that so-called "marginal" areas become "central," with a series of traits that are peculiarly well suited to the needs of the people who lived there, while the "heartland" becomes "peripheral" to the marginal center. Differentiation of implements, of techniques of hunting and gathering, and other aspects of human activity occur, possibly in response to differences of environment which favor regional diversification of fauna and flora. As a case in point we note that to Archaic inhabitants of Kentucky, Tennessee, and Alabama, the collecting of shellfish was of paramount importance. Griffin (1952a: 354) is a spokesman for the contention that Archaic people of the Northeast relied to a great extent on shellfish. The fallacy of this dictum becomes apparent when one observes that what appear to be the earliest northeastern Archaic sites — not only Lamoka, but Tadoussac, those in eastern Maine, Ellsworth Falls, and some in Middle Atlantic states as well — are quite devoid of shells. (At the Lamoka site, shells appear in the upper, and more recent, level.)

Kingsbury and Hadlock (1951) have published data on a site near Eastport, Maine, at which there was no shell midden. Other sites which lack shell middens — all located on Passamaquoddy and Cobscook bays — are represented by collections made by Theodore L. Stoddard for the R. S. Peabody Foundation, in Andover. Several of these sites have been heavily eroded by high tides, perhaps as a result of a rise in sea level. Farther west, the Taft's Point (Hadlock 1939), Waterside (Rowe 1940), Nevin (R. S. Peabody Foundation, unpublished), and Golden Cove (Bates and Winlock 1912) shell heaps exhibit lower levels which are devoid of shells. In at least two of these — Taft's Point and Nevin — there also appears to be evidence of washing by storm waves, or partial submergence. It may be argued that shells were dumped elsewhere than on the area represented by shell-free midden, but the apparent consistency of these remains suggests a coastal occupation by people who subsisted on birds, fish, and sea mammals, in addition to creatures of the forest (Rowe 1940: 16). At the Nevin shell heap the layers of shells which appear to be the oldest contained a relatively large proportion of shells of species which lived on the surface of the flats — oysters (*Ostrea*), quahogs (*Mercenaria*), scallops (*Pecten*), mussels (*Mytilus*), and snails (*Polinices*). It seems likely that it was only in later times — perhaps only shortly prior to the introduction of pottery of Point Peninsula style — that the clam (*Mya*), a species that must be dug from the flats, was extensively exploited to the almost total exclusion of other species of mollusk. Reliance on shellfish for a large part of the food supply continued in New England until historic times.

The Archaic stage is no more a distinct and precise chronological unit with uniform continent-wide limits than is the period of contact with European explorers. While technological advances, coupled in all probability with greater complexity in social organization and religious practices, had lifted most of the tribes of the central part of the continent from the Archaic stage by the beginning of the Christian era, these advances were not simultaneously transmitted to all North America. In parts of the continent an unfavorable environment made their acceptance impossible. The Montaignais and Naskapi, for example, were so far to the north that they could only make a living as hunters. The Micmac, once makers of pottery and tillers of corn, had abandoned both arts when the French arrived, and, with their neighbors to the north, were living examples of the Archaic stage of culture. So, too, the Karankawa and others along the Gulf coast, the gatherers of the Basin and Plateau, and most tribes of the Pacific coast of North America persisted in a life unencumbered by horticulture, or breakable vessels of pottery.

Since stage of culture can only be determined by an analysis of cultural traits represented at any site, it is evident that a date per se is not necessarily a valid indicator of stage of culture. To be valid for such purposes, a date must apply to a province in which the chronology of culture has already been worked out on the basis of adequate series of excavations. Even then, a sample may date a backward group. The prehistory of Europe is full of examples of cultural lag. Unless it can be shown that Americans were different in this respect, it must be assumed that they acquired new ideas as people of the Old World did.

Another limitation on archaeological thinking has derived from belief that primitive cultures in the New World originated from a pri-

mary center, possibly with secondarily developed subcenters. It has long been believed that pioneers from Asia crossed the Bering Bridge and populated the New World. While we have readily admitted that successive waves of people or ideas could also penetrate to the New World, we have been slow to give up the idea that some pilgrim band of elephant hunters laid the foundation of aboriginal American culture. Until radiocarbon dates aroused us to realization of the antiquity of some of the less specialized cultures, it was commonly believed that the Early Hunter or paleo-Indian stage was a necessary preliminary step along the main road to higher American culture, and that it was not until after the great Pleistocene animals had been exterminated that men became hunters of smaller game and collectors of vegetable foods and shellfish. Because knowledge of early inhabitants of the continent rested on a few widely separated but consistent finds, the hypothesis was readily accepted. Within recent years great numbers of points of general Clovis form have been found east of the Mississippi. A number of camps—Bull Brook, Shoop, Williamson, Quad, and Reagan, among others—with large numbers of industrial tools, have given more information about the general Clovis complex than most of the "kills" in the West. The numerical preponderance of the Clovis complex in the East, as opposed to relatively fewer finds in the West, and to the total absence of such forms from Asia lends some substance to the hypothesis that this complex may have been developed in the Southeast.

If this independent invention of skilled flint working be granted, it is implicit that it arose from a base which has so far escaped identification. Quite possibly the people whose culture formed this base possessed skills in flint working of a general late Levalloiso-Mousterian order — an industry on the verge of blade making but not yet capable of the fine work of the Solutrean craftsmen. Ancestry of the Clovis industry may lie hidden in some undiscovered primitive and generalized hunting-gathering base which was the sole cultural endowment of early immigrants from Asia. This hypothetical generalized hunting-gathering group could also have been the source from which Archaic cultures developed.

Measurements of the radiocarbon content of a number of samples have begun to push human occupation of the New World well back toward the beginning of Wisconsin time. Fires burned in basin-shaped hearths near Lewisville, Texas, more than 37,000 years ago (O-235, O-248; Anonymous 1956: 396). Antiquity of nearly the same order is indicated for remains of a fire near Tule Springs, Nevada, where charcoal more than 27,800 years old (C-914) has been found under circumstances that suggested to the finders the use of fires for roasting animals of presently extinct species which were butchered nearby (Harrington 1934, 1956). Other finds of a similar order of antiquity have been reported from western states, but all must be viewed with caution until one can establish unquestioned human responsibility for observed phenomena to the total exclusion of natural events. It has not always been possible to do this. Redeposition of fossils, of artifacts, or of charcoal can occur in such a way that purely fortuitous association results. If these ages are unquestionably associated with human activity, they place man in the New World so long ago that he had time to spread across the continent before the maximum of the Wisconsin glaciation and to develop cultures to all intents autochthonous in widely separated regions. Since that first immigration, new ideas have been brought to the New World as men possessed of the ability have seen fit to cross the Bering Bridge or Strait.

The Bull Brook (Byers 1954), Shoop (Witthoft 1952), Williamson (McCary 1951), and Reagan (Ritchie 1953) sites are believed, solely on typological grounds, to be the oldest in the Northeast now known. However, there is another class of material, never yet adequately excavated or reported, that is represented by deeply weathered and patinated spears or knives which are occasionally found in surface collections and rarely in the ground. On the few occasions when such implements have been uncovered by commerical operations or by collectors, they appear to have come from such depth as to indicate considerable antiquity. Conceivably these may represent some as yet unidentified proto-Archaic, lacking implements made by grinding, but with chipped implements that differ from those of the Specialized Lithic of Fluted Point tradition. [Radiocarbon dates from Bull Brook are in press, Byers, 1959, AMER. ANTIQ., Vol. 24, No. 4 — EDITOR.]

Cultures of Archaic stage are in general distinguished from industries of Unspecialized Lithic and Specialized Lithic (Johnson 1956)

by the employment of grinding as a tool-forming technique. In this category fall a number of very distinct Archaic traditions which, at the present state of our knowledge, do not appear to be closely related. On the one hand, these may be confined to certain geographic zones; on the other, they may well be expressions of degrees of cultural and industrial development. In order to establish properly the position in time and in cultural development of the several Archaic traditions, the most precise and exacting techniques of excavation are required.

A surprisingly large number of excavations have been made in the Atlantic coastal province between New Brunswick and Virginia. Unfortunately, some of these were made long ago by methods not now acceptable. Others were at sites that have either been occupied over a long period or reoccupied before a distinct sterile zone could form to dissociate the components, so that the picture is not really clear. Here, if ever, the need for meticulous control is greatest, but it is in this field that the greater part of the work has been carried on by persons whose training has not always been adequate for the job at hand. Detailed citation of this work is not given here.

Still another facet of the problem deals with surface collections from sites that have been hunted for years. The work of Evans and Holland in Virginia, outstanding in this respect, and that of Kier, in New Jersey, will be referred to as examples of a method for salvaging valuable information from sites which might otherwise be written off as useless for determining archaeological sequences.

The Coastal Archaic

Having considered only the general aspects of the problem we shall now turn to a more detailed examination of the evidence. We shall begin by examining data from the Middle Atlantic states in an effort to see whether or not cultural influences which are apparent in southern New England can be traced to a more southern source. We shall then turn to northern New England, in order to examine in considerable detail data which have been uncovered there, finally turning to Canada before summarizing and attempting interpretation.

That the technique of seriation can be productive of results with surface collections is ably demonstrated by Evans (1955) and Holland (1955). While Evans turned his attention to potsherds, Holland devoted his attention to stone implements. He has continued this approach in two other studies (1956, 1959). By establishing types (Fig. 1 *A-O*) and seriating sites in terms of frequency of selected types, Holland has been able to show with considerable success that there was a consistent shift from larger implements with bases modified for hafting to trianguloid forms. For example, his notched and stemmed types (Fig. 1 *G-M*) popular in preceramic or early ceramic levels, are replaced by trianguloid forms (Fig. 1 *A-D*) which constitute a very large proportion of the chipped implements found on pottery-bearing sites. On pottery-bearing sites which are believed to be the most recent, small trianguloids of his Type A increase in frequency as the historic horizon is approached. The trend to smaller trianguloid points appears to be consistent in all parts of Virginia to which Holland has applied his technique.

Holland (1959) has isolated "chert-using" and "quartzite-using" preceramic foci in northwestern Virginia and demonstrated that the latter tends to have larger knives than the former. Size may be governed by dimensions of available raw material. The preferred rock was probably the most readily available as was true in the case of quartz and silicified schist in south central Virginia (Holland 1956). This bears out Holland's statement (1955: 175) that "the real meaning of the rock preference is primarily a regional attribute and secondarily a culture trait."

Preceramic sites in northwestern Virginia also yield a few fragments of soapstone vessels; crude chipped axes and crude chipped celts, neither of which shows any sign of grinding along the bit; end scrapers, both hafted and not hafted; expanded-base drills and some plain drills; and occasional pendants. Some pecked and polished celts — an implement attributable to a late horizon — were found on sites represented by collections overwhelmingly of Archaic character, but with some evidence of brief occupation by people who use pottery. All forms mentioned above are also found on later sites, where pottery is found. It is rather surprising to discover that Holland has no reliable evidence for bannerstones from any site.

Material from New Jersey published by Kier (1952) deals with two sites visited by the Archaeological Survey of New Jersey (Cross 1941) —Goose Island and Salisbury—and contributes

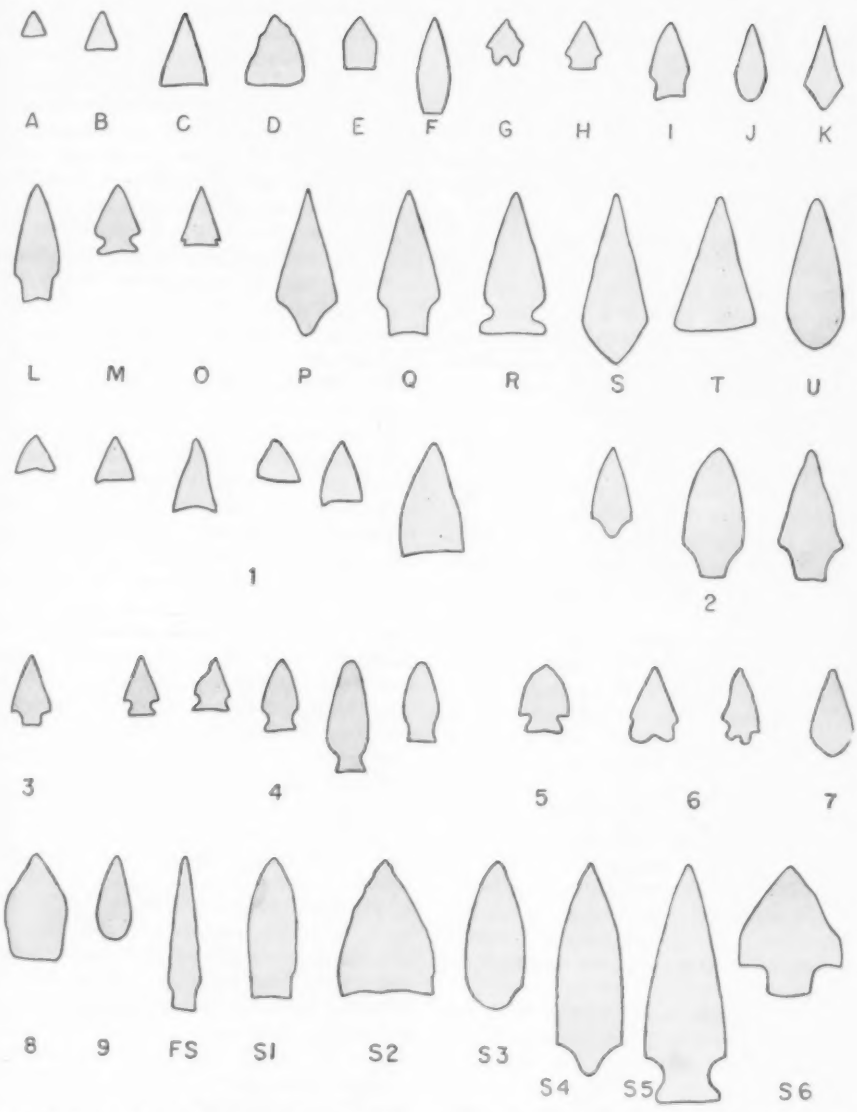

FIG. 1. Outlines of types of projectile points. *A-O*, arrowpoints; *P-U*, large blades, after Holland (1955); *1-9*, arrowpoints; *S1-S6*, spearheads; *FS*, "fish spear," after Cross (1941). Cross' spearhead Type 7, Oblique Notched, which is essentially like arrowpoint Type 5 except that the blade is triangular, has been omitted. All ¼ natural size.

as well a new one, the Konzik site. Kier (1948) reports the last site but does not call it by this name. Woods Mill, a small site dug by the Unalachtigo Chapter of the Archaeological Society of New Jersey, is published by Kier (1953). No pottery was found at Woods Mill. Arrowpoints of Type 2 (Fig. 1) constitute 50% of the total while Type 9 forms 11.4%; Type 3, 10%; Type 1, 9%; and Type 4, 8%. Other specimens include a fully-grooved ax, a celt, a pestle, and a fragment of a bannerstone. The collection from the Konzik site includes points of Type 2, 55%; Type 1, 18%; Type 9, 13%; and Type 3, 6%. The larger items include two ¾-grooved axes, two celts, two pestles, a fragment of a gorget, and three fragments of bannerstones. At both sites a good proportion of the arrowpoints of Type 2 are made of shale or argillite, although quartz, quartzite, jasper, flint, and other rocks are also utilized. The large proportion of points of Type 2 at these sites seems to reflect the preference for stemmed forms in early times which Holland has demonstrated in Virginia.

Surface collections from Goose Island include only 28% of Type 2 forms as compared with 41% in this category in the excavated collection, while the Type 1 forms constitute 15% of the surface collection as opposed to 7% of the excavated arrowpoints. The surface collection adds steatite sherds, steatite-tempered pottery, 2 fully-grooved axes, 1 celt, 3 pestles, and 4 fragments of bannerstones (Kier 1952). These objects, together with plain-surfaced pottery with a mat-impressed flat bottom, suggest that Goose Island was occupied by people of a Late Archaic to early Preformative stage of culture. Cord-marked and incised sherds, together with a higher percentage of smaller projectile points found on the surface, indicate that the occupation continued into more advanced stages of the Preformative. The same may be said of the Salisbury site.

The small sample from Woods Mill and Konzik analyzed by Kier indicates that the door is not shut on the possibility of a subdivision of the Archaic stage in which argillaceous materials were preferred for making stemmed points. It now seems most likely that at least one prepottery stage existed in New Jersey.

Included in collections of the New Jersey Archaeological Survey are semilunar knives, one from Red Valley and 15 from the Abbott Farm (Cross 1941; 1956). Philhower (1936) records 46 more, including chipped as well as polished ones, represented by fragments or complete specimens. Several forms of bannerstones came from Goose Island, Salisbury, Koens-Crispin, Red Valley, and the Abbott Farm, along with fully-grooved axes and fragments of stone vessels. People have probably lived at most of these places for a long time, but not necessarily without interruption. I say this because finds include not only a large percentage of plain-stemmed and side-notched points of Types 2 and 4, but a reasonable proportion of triangular ones of Type 1 as well. Koens-Crispin is the only one of these sites at which the percentage of Type 1 points is insignificant. Points of Type 1 are associated with forms of pottery that are known to be late, including the Riggins types of McCann (1950) as well as others (Cross 1953). While it is tempting to group semilunar knives together with certain forms of large stemmed points, steatite, grooved axes, drills, pestles, and bannerstones into a "complex," the large sites in New Jersey have been so extensively disturbed by their aboriginal occupants that substantiating evidence does not occur in them. All these objects have been found in prepottery contexts in states bordering New Jersey, as well as in some small prepottery sites in New Jersey and there can be no doubt that they belong to a similar horizon in that state as well. It would be necessary to rework collections from large New Jersey sites in terms of smaller one-period sites in order to demonstrate the succession of components.

Vessels made from steatite and other stones are found from Alabama (Webb and DeJarnette 1942, 1948a, 1948b, 1948c) and Georgia into New England. Steatite bowls were carried west to Poverty Point, Louisiana (C. H. Webb 1944, 1948; Ford and Webb 1956: 106-10, 126). It is the general belief that the making of stone bowls was confined to late Archaic or early Woodland horizons such as that represented at Marcey Creek (Manson 1948). Holland's data (1959) support this view. The possibility that people began to make stone vessels at more than one center is suggested by Witthoft's (1953) description of vessels that are "oval to rectangular, flat-bottomed, straight to sloping sided." This description does not conform to the more common shapes in New England which resemble a melon split lengthwise, frequently with one or two projecting flat lugs as handles (Willoughby 1935, Fig. 84). At the Abbott Farm, Cross (1956: 101) found frag-

ments not only of flat-bottomed, straight-sided stone vessels, but of roughly hemispherical or oval ones as well. One sherd includes a lug handle (Cross 1956, Pl. 28 *b*, *11*) but its shape differs from that of lugs on hemispherical to oval bowls (Cross 1941, Pl. 5 *a*). The hemispherical to oval vessel with projecting flat lugs may prove to be a northern form, but its distribution is very wide; even mud and bark Basketmaker III vessels (Morris 1927: 150, Figs. 3, 6 *b*) seem to reflect this stone prototype. Basically, the form comes close to being the simplest one with handles, so that similarities over such great distance may be only coincidental. Flat-bottomed, straight-sided vessels of stone are widely distributed, both in time and space in North America. It is idle speculation to wonder whether straight-sided vessels were elaborated from the more widespread hemispherical to oval form by people who had been using bark buckets or splint baskets.

In Pennsylvania, straight-sided stone vessels are associated with Susquehanna broad spears, and distributed along with other objects of this complex from Chesapeake Bay to the headwaters of the Susquehanna (Witthoft 1953). Sources of steatite in the District of Columbia and Virginia have been described by Holmes (1890), Fowke (1894), and others, while Crozier (1939) identifies extensive quarries at Christiana, Lancaster County, Pennsylvania, and at Conowingo, Maryland. This general area appears to have been a focal point for development of Late Coastal Archaic. The distribution of steatite from these quarries, and of implements made from rocks obtained in eastern Pennsylvania, indicates a wide trade by late Archaic people (Kier 1952).

If we now shift our attention northward, we discover that stemmed and side-notched points, semilunar knives, steatite vessels, grooved axes, drills, and bannerstones are also characteristic of Long Island and southern New England, where they have been found separately or in various combinations at a number of sites (C. S. Smith, 1950; Latham 1953; Patterson 1955; Sargent 1952; Glynn 1953; W. S. Fowler 1951; Robbins 1943; Johnson and Raup 1947). With them are also found trianguloid projectile points. Side-notched points of early horizons usually exhibit broad, shallow notches, and those from Long Island with concave bases are the "fishtailed" forms characteristic of Orient sites. Some side-notched forms closely approximate the "Lamoka" point. Perhaps we can interpret Lamoka chipped implements as a reflection of a very early industry spread along the piedmont and coast. Points with tapering stem, called "lozenge-shaped" by some writers (Fig. 1 *K*, *7*), are widely distributed along the coast and points with bifurcated bases (Fig. 1 *G*, *6*) appear as minority forms. Although it is tempting to see such objects as expressions of one complex, it must be emphasized that the evidence is only circumstantial and indirect, and that no extensive "closed" site has been excavated at which this complex occurs. Furthermore, persistence into late times of forms of stone tools characteristic of early horizons is a common phenomenon in northeastern archaeology.

Latham (1953) reports broad-bladed spears, including Pennsylvania types, in association with steatite vessels at Orient sites. Furthermore, he reports taking a low, elongate pottery vessel with a lug at each end from the fill of an Orient burial pit at Jamesport, Long Island. This vessel was not tempered with steatite, but it brings to mind straight-sided, flat-bottomed steatite-tempered vessels with lugs, which occur in Pennsylvania. Such rather nebulous evidence gives an impression of coastwise distribution of certain material traits from a center in the general area of Chesapeake Bay, northward at least as far as Long Island and southern or central New England.

We may postulate a Late Coastal Archaic on the basis of association of certain forms of points with steatite vessels, grooved axes, and bannerstones, in New England and the Middle Atlantic states. Early horizons of this postulated Coastal Archaic are characterized by choppers; grooved axes which in the earliest forms are chipped but not polished; and by large lanceolate and trianguloid points with bases modified for hafting by removal of corners to produce tapering or straight stems, by removal of shallow side notches, or by retouching the sides of the base only enough to produce barbs above a rather broad stem. Later horizons are characterized by introduction of the spear-thrower with several forms of weight, and terminal phases, by the use of steatite vessels, and some forms of cord-impressed pottery.

Evidence confirming this relationship was brought forward by Ritchie (Ritchie 1957: 12-13; Guthe 1957: 331-2). At the Stony Brook site, on Long Island, Ritchie discovered debris

of general Orient character above a level in which there were side-notched, corner-removed, and stemmed points. This lower level he identified with the Laurentian *tradition* (italics mine) of interior New York. At the Wading River site, Lamoka-like points were found in association with chopper, celt, and notched bannerstone. Orient people used not only "fish-tail" points (side-notched, with concave base) and steatite vessels, but also grooved axes, gouges, two-holed gorgets, and at least two forms of bannerstones. Orient appears to be an outgrowth of Coastal Archaic, brought about by the introduction of new ideas, perhaps from the interior of New York.

In southern New England, two or more horizons are represented by sites dug by Bullen (1949), Moffett (1946, 1951a, 1951b), and others summarized by Bullen (1948). The small E. D. Prey site, near East Killingly, also may have been stratified. In 1936, when the site was dug, there was no evidence that the land had ever been under cultivation. It lay below the spring highwater of a small mill reservoir; the upper part of the loam had been disturbed by flooding. The small collection from this site is now at the R. S. Peabody Foundation (Byers 1958). Implements from the loam and a poorly-defined zone termed "base of loam" or "junction" are of quartz, quartzite and green shale, and include stemmed points, quartz "turtlebacks," small scrapers, and knives of various forms and state of preservation (Fig. 2 *1-11, 17-19*). The shale points are identical with some of similar material found at a site near Perryville, Rhode Island, from which no pottery was recovered. They were associated with stemmed points, including two of a quartzite similar to that at Moosup, Connecticut, a pestle, and a semilunar knife with gouged-out holes. The semilunar knife and pestle mark the Perryville site as Late Archaic, and thus establish a somewhat tenuous cultural peg on which to hang the upper part of the E. D. Prey site.

Implements from the underlying till at E. D. Prey (Fig. 2 *12-16, 20-25*) are, with one exception, of quartzite which looks much like the outcrop at Moosup. They include a small, lanceolate point with a straight, thinned base (Fig. 2 *12*); fragments of two points, one of which is stemmed; nine subrectangular to ovoid knives or scrapers; five miscellaneous worked pieces, and a flake of fine-grained cherty stone (Fig. 2 *25*). It is possible that the quartzite implements from the "junction" belong with implements from the till, and that apparent difference in their situation is due to processes involved in formation of the soil profile.

The Charles Tyler site, in Moosup, Connecticut, dug by G. D. Pope (1952), is located close to the outcrop of quartzite referred to above. The Tyler site had formerly been under cultivation. Pope found potsherds and many forms analogous to, if not identical with, the forms from E. D. Prey as well as many that were not found at the latter place. He observed no signs of stratification. Although the E. D. Prey site seems to have been stratified, it is not possible to be too dogmatic about it in view of the size of the sample, nor is it possible to dismiss the Tyler site as completely mixed.

Griffin (1946: 42) has compared E. D. Prey to Greenman's George Lake material (Greenman and Stanley 1943), but it appears to me that some of the quartzite specimens bear a closer resemblance to certain implements in the DeTurk complex described by Witthoft (Johnson 1956). There are also resemblances to some of the pieces from the Kelley phase at Ellsworth Falls, described below. It seems to me that these three — DeTurk, E. D. Prey I, and the Kelley phase — are expressions of an extremely primitive stage of culture. It is quite possible that the stone-working technique used to manufacture these implements survived until comparatively recent times. Until some other means of assessing the age of E. D. Prey I can be found, it seems unwise to impute any chronological position to it, in spite of the apparent stratigraphy. Without a larger collection, it is difficult to do more than hazard a guess that it may be the remains of an occupation of extremely Early Archaic character, perhaps bordering on Unspecialized Lithic.

Evidence from the sites dug by Bullen, Moffett, and others, and discussed by Bullen (1948) argues for the priority of large corner-removed points, side-notched points, "eared" points — trianguloid forms with barbs produced by carefully retouching the basal edges — and stemmed points, but it must be noted that some of these forms persist after small forms are developed and pottery is introduced. The difference in size between quartz points and larger corner-removed, side-notched, corner-notched, eared and stemmed forms made of other materials may be a function of the size of the pebbles from which quartz implements were

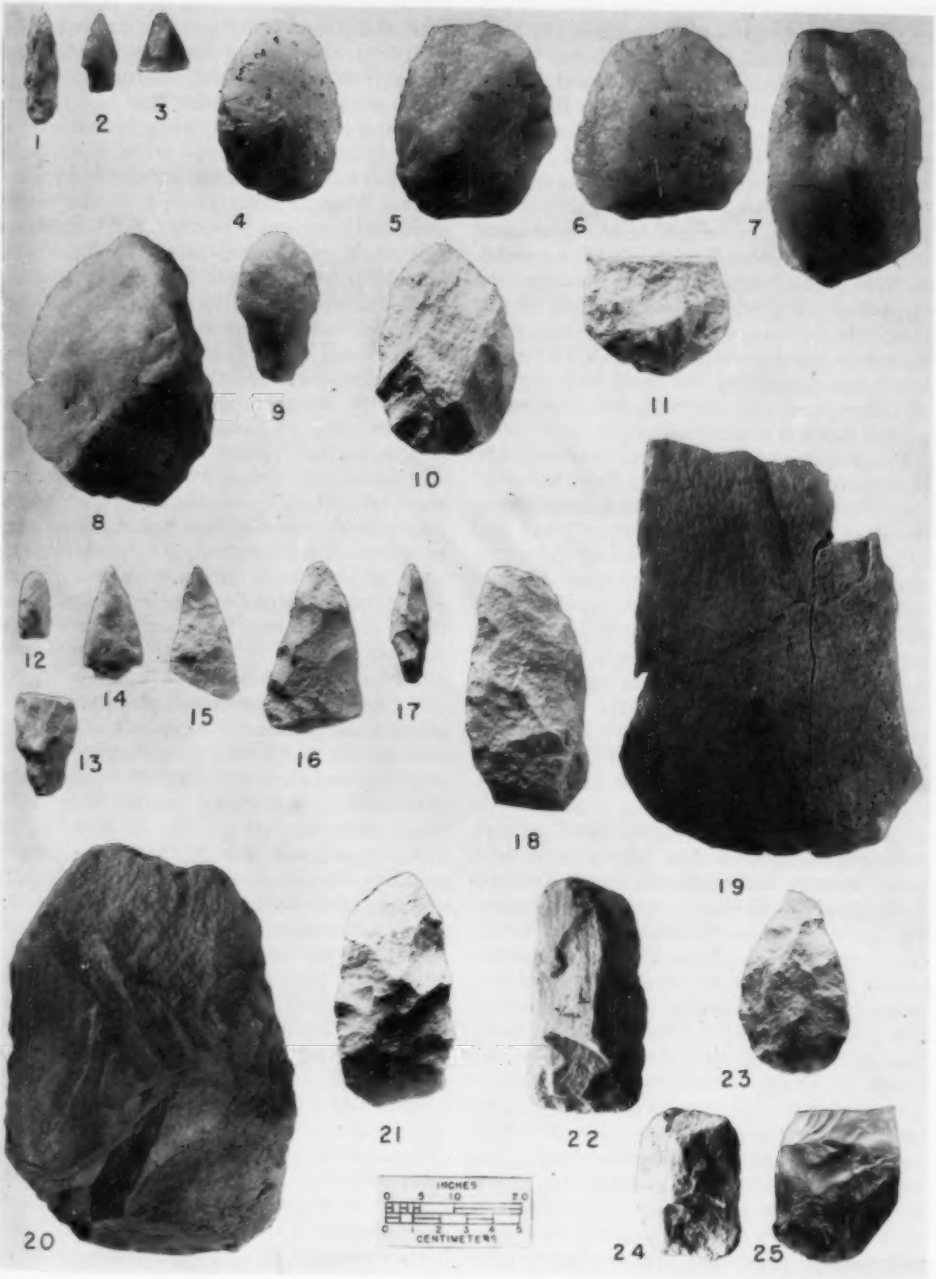

FIG. 2. Implements from the E. D. Prey site. *1-11*, from the loam; *17-19*, partly in loam and partly in till; *12-16, 20-25*, from the till.

made. Moffett's (1951b) Holden site had a distinct preceramic level which appears in some ways to be related to an unpublished collection from the Freeman-Paine site made by the late Howard Torrey and now in the R. S. Peabody Foundation. The Freeman-Paine site, in turn, is completely preceramic and the collection displays some as yet unevaluated similarities to the Moorehead complex of Maine (Rowe 1940), as well as to material from late Archaic sites in southern New England and Long Island. Moffett (1951a) found steatite sherds at the Holden site and the Rose site either in the lower part of the ceramic horizon or the uppermost part of the preceramic. Two forms of bannerstones, notched and ovoid, as in the case of Orient, are also reported, but their stratigraphic position is not clear.

Weights for spearthrowers, of ovoid and bipennate forms, are reported from the Ford site (Robbins 1946); bipennate forms were found at Nunkatusset (Engstrom 1951) and collections in the Bronson Museum, Attleboro, Massachusetts, contain many that are not definitely assigned to any cultural context. While the ovoid form appears to be common in New England and immediately surrounding areas, the bipennate forms are reminiscent of specimens found in the Southeast and Middle Atlantic states. Both are found in graves of the Moorehead complex (Rowe 1940) or Maine Cemetery complex (B. L. Smith 1948, Fig. 23).

There is no definite evidence to guide placement of these traits in a chronological scheme. Stemmed or side-notched points occur with other forms at four submerged sites — Stewart's Island (Robbins 1943), Grannis Island (Sargent 1952), Pilot's Point (Glynn 1953) and Grassy Island (Johnson and Raup 1947). At Stewart's Island and Grannis Island they are associated with fragments of steatite vessels; at Grannis Island, with sherds of Vinette Interior Cord-marked vessels as well. Failure to find potsherds at Grassy Island and Stewart's Island may be due to chance or to destruction of the sherds rather than to absence of pottery from the cultural inventory of the inhabitants. Steatite sherds were found at Nunkatusset as well as at other sites in southern New England. Vinette Interior Cord-marked in association with steatite at Grannis Island seems to mark these sites as Late Archaic in cultural status.

I here envisage Coastal Archaic as material evidence of a stream of cultural influences flowing along the Atlantic slope from earliest times. That this stream continued in later times is evident from the marked similarities to be noted not only among the social organization of the tribes of southern New England and those of tidewater Virginia, for example, but also in such details of material culture as cloaks of turkey feathers which are known from southeastern Massachusetts as well as coastal Virginia and Carolina (Flannery 1939: 182-4).

Because of limitations on archaeological knowledge brought about by destruction of perishable things we are forced to base our reconstructions on only a scant fraction of a complete inventory. Therefore my term "basic" has a connotation which is somewhat different from that of the same word when used in describing a "basic kit." A "basic kit" is something on which one builds more elaborate outfits by the addition of accessories. My "basic" Coastal Archaic kit is "basic" only insofar as it presents in imperishable materials a common denominator of stemmed, side-notched, and corner-removed projectile points or knives to which may be added the following elements: semilunar knives, based on retouched spalls in earlier times or polished all over where suitable materials were available, with gouged-out holes in older polished forms, and one-piece comb back in more recent ones; steatite vessels in Late Coastal horizons; choppers, in Early Coastal, probably continuing into Late Coastal; grooved axes in both Early and Late horizons (gouges work southward after the introduction of grooved axes, reaching as far as New Jersey); simple forms of grinding implements such as slab mortars and mullers, succeeded by pestles, probably used with wooden mortars; and bannerstones of various forms, probably in Late Coastal. The diversity of form afforded by bannerstones provides testimony to the diversity of ways by which this artifact reached New England.

The Boylston Street Fishweir (Johnson and others 1942, 1949), built of stakes sharpened with blunt instruments that are assumed to have been stone axes, attests to a society so organized that work could be directed and coordinated. The weir itself has now been dated. Stakes secured during construction of foundations for the I.B.M. Building, in August and September, 1957, have been assayed through the courtesy of the Humble Oil Company. These place the structure as follows: O-474, 2550 B.C. ± 130 years; O-475, 2500 B.C. ± 130

years (letter of March 19, 1958, to Frederick Johnson).

Small points of quartz and other stones appear in preceramic horizons in New England and survive well into ceramic horizons; they occur only in ceramic horizons in Virginia, and there chiefly in triangular shapes. It is possible to interpret this apparent disparity of time as a factor of lag in the northward spread of pottery rather than as a lag in the southward spread of these small trianguloid points from a supposed center among Dorset Eskimo as Bullen (1951) suggests. On the other hand, Holland (1959) introduces evidence to show that small trianguloid points, often of quartz, together with pottery, came into northwestern Virginia from the southwestward. I am not aware of the finding of small trianguloid points in any significant quantity between Dorset sites and central New England — certainly none have been identified along the coast of Maine or in adjacent portions of the Maritime Provinces where we are beginning to have fair knowledge of the archaeologic column. The significance of these two apparently inconsistent occurrences is not yet fully understood.

THE BOREAL ARCHAIC

That there was some extension of southern influences into northern New England and the Maritime Provinces is shown by the occurrence of at least two forms of bannerstones in Maine (B. L. Smith 1948, Fig. 23), and the grooved ax in Nova Scotia (Nova Scotia Museum of Science Collection), New Brunswick (New Brunswick Museum Collection), as well as in Maine. The grooved ax may not have penetrated so far east until local cultures had come under influences from areas to the south and west in which Preformative levels had been approached. In Maine, one fragmentary example was found in the upper part of the Nevin shellheap, and several, taken by Cushing from pottery-bearing shellheaps along Eggemoggin Reach are now in the U. S. National Museum (Moorehead 1922, Fig. 122). A grooved ax from the Godfrey Collection is regarded by B. L. Smith with suspicion, and one from "Orland" in the Marks Collection (R. S. Peabody Foundation, No. 51200) may have gotten into that collection by various means. None can be surely assigned to the unit termed Moorehead complex by Rowe (1940: 150) or Maine Cemetery complex by B. L. Smith (1948).

The Moorehead complex is best defined by Moorehead himself (1916; 1922: 149), but his term "Red Paint People" is unacceptable for several reasons. It is probably the most widely known and at the same time most striking expression of Archaic culture in the Northeast. Careful excavations carried out by Willoughby seem to be the exception, rather than the rule, for collections were gathered by any method, even to the legendary plowing of the Emerson cemetery by Hannibal Hamlin. The fact remains that until 1936 the dwelling places of the people who buried their dead with red ochre were never excavated. Largely because of preconceived ideas of what should and should not be found, a number of promising village sites were passed over. In recent years these formerly mysterious people have begun to fit into their proper place in the Northeast. Sites at Ellsworth Falls have been instrumental in accomplishing this feat.

The Ellsworth Falls Sequence

Ellsworth Falls is a small community on the Union River in Maine — a suburb of Ellsworth, situated where the river begins its descent into a gorge that extends to tidewater. Along the river bank, particularly near the falls and pools, there once were camps of Indians who came each year for runs of fish. A power dam at the lower end of the gorge has flooded several of these sites; saw-mill dams at the head of the gorge flooded the upper rips and submerged two sites, Wasp Island on the west, and Smith Farm on the east side of the river, just at the head of the quickwater. The last mill dam is gone, and the sites lie exposed. The height of water is now controlled by gates in the dam about two miles upstream.

The sites on Wasp Island and at the Smith Farm were excavated jointly by the Robert Abbe Museum and the R. S. Peabody Foundation from 1947 to 1950. W. S. Hadlock excavated part of the Smith Farm site in 1946.

Four levels of occupation were exposed, but all are not present throughout the sites, and if Occupation 1, the lowest, is present on Wasp Island, it may never be reached until the water is allowed to drop to its natural level. Through a process of silting that is not now understandable, these two sites were buried; a subsequent cycle of down-cutting lowered the river bed well below the sites before modern interference altered the water level. Wasp Island, lying on

the inside of a bend, was subject to action by the river which differed from that affecting Smith Farm, on the outer curve.

The topmost level, termed Occupation 4, comprises the pottery-bearing strata in which fragments of vessels of Point Peninsula and later styles are found. This is equivalent to the Asticou of Rowe (1940). Occupations 2-4 are stages along the continuum of a boreal culture. New forms appear, and old ones survive, so that there is no abrupt break at the transition. Occupation 3 is terminated by the introduction of Vinette I pottery, and may be accepted as an expression of Late Boreal Archaic. It forms the foundation on which later local cultures are based. The date of 1400 B.C. ± 400 years (M-90) belongs here. This horizon is characterized by the use of percussion and pressure flaking in making chipped implements, and by chipping and pecking followed by polishing, in some cases over the entire surface, of heavier edged tools. Implements (Fig. 3) include stemmed and side-notched projectiles; a few "thumbnail" scrapers and fewer keeled scrapers; gouge and adz of forms typical of those in graves of the Moorehead complex; plummets; and ovoid bannerstones. The pendant (Fig. 3 *9*) appears to have come from this level. It was found in a root channel close to the depth of implements of Occupation 2 style. The small bear effigy (Fig. 3 *16*) was not found in situ. It may belong with either Occupation 3 or Occupation 2. There can be no doubt about connections between Occupation 3 and the Moorehead complex since striking parallels occur (Fig. 3 *24* and *25*, *26* and *27*). Occupation 3 equates with Rowe's (1940) Waukeag.

Occupation 2 is poorly distinguished from Occupation 3, but there are a number of significant characteristics. I know of no other site where the sum total of these objects, typical of Occupation 2, has been found. Chipped implements are by no means common. They are percussion flaked, and those shown in Figure 4 *1-6* are a large proportion of the total.

Fragments of stone rods (Fig. 4 *17-19*) recall those illustrated by Willoughby (1935, Fig. 45), Wintemberg (1943, Pl. 25 *D 10*), and B. L. Smith (1948, Fig. 21 *a*). That shown in Figure 4 *20* appears to be a nearly unaltered pebble which may have been raw material for such a rod, while Figure 4 *17* appears to be a fragment of one pecked out before polishing.

Polished slate spears are of simple forms (Fig. 4 *9-11*). Those shown in Figure 4 *9* and *10* call to mind one illustrated by Parker (1920, Pl. 18 *2*) but are not identical with any illustrated by Moorehead (1922, Fig. 57) or Willoughby (1935, Fig. 33). They may have been made from a blank (Fig. 4 *12*) chipped and pecked to size and then rubbed down with sandstone whetstones (Fig. 4 *13-16*).

The chipped adz, polished only on the bit (Fig. 4 *26*) was the only specimen of its kind found at this level. Adzes appear to have been made most commonly from pebbles that were pecked without greatly altering the shape and polished along the bit only (Fig. 4 *31-33*) or from fragments of rock that may have been chipped, but were primarily bit-polished (Fig. 4 35). The adz shown in Figure 4 *36* has a shallow groove and a ridge along the back, and is pecked from very soft rock; it, too, shows polish only along the bit. The battered fragment of gouge shown in Figure 4 *34*, was closely associated with Figure 4 *32* and *33*. It is pecked externally and shows polishing only in the groove and along the right-hand edge.

Plummets may be attributed to this level as those shown (Fig. 4 *21*, *22*) came from a position that makes this assignment very probable. Several end-notched pebbles, possibly bolas stones (Fig. 4 *23-25*, *27*), serve as a guide to the position of others exposed by the river. On the other hand, three or four found by Moorehead near Mason's cemetery and labeled "strays" may indicate survival of these implements into Occupation 3, although such a find is no certain guide to stratigraphic position.

Among other implements assignable to this level are large scrapers, consisting of spalls with no retouch, but with worn edges.

The date of 2009 B.C. ± 310 years (M-89)* probably applied to the upper part of Occupation 2, but the pit from which the sample was taken may have originated at a level consistent with earliest Occupation 3. Since there is scant difference between them at this point, the cul-

* The date of 2005 B.C. published by Byers and Hadlock (1955) and Hadlock and Byers (1956) was obtained by subtracting 1954 years (the determination was made in 1954) from 3959, a weighted average of 4150 and 3800, the results of two separate runs on the same sample. Crane's date (1956) published as 3975 B.P. is a simple arithmetic average. The date here quoted represents the Byers and Hadlock date adjusted by the subtraction of 1950 years in conformity with practice outlined in the Introduction.

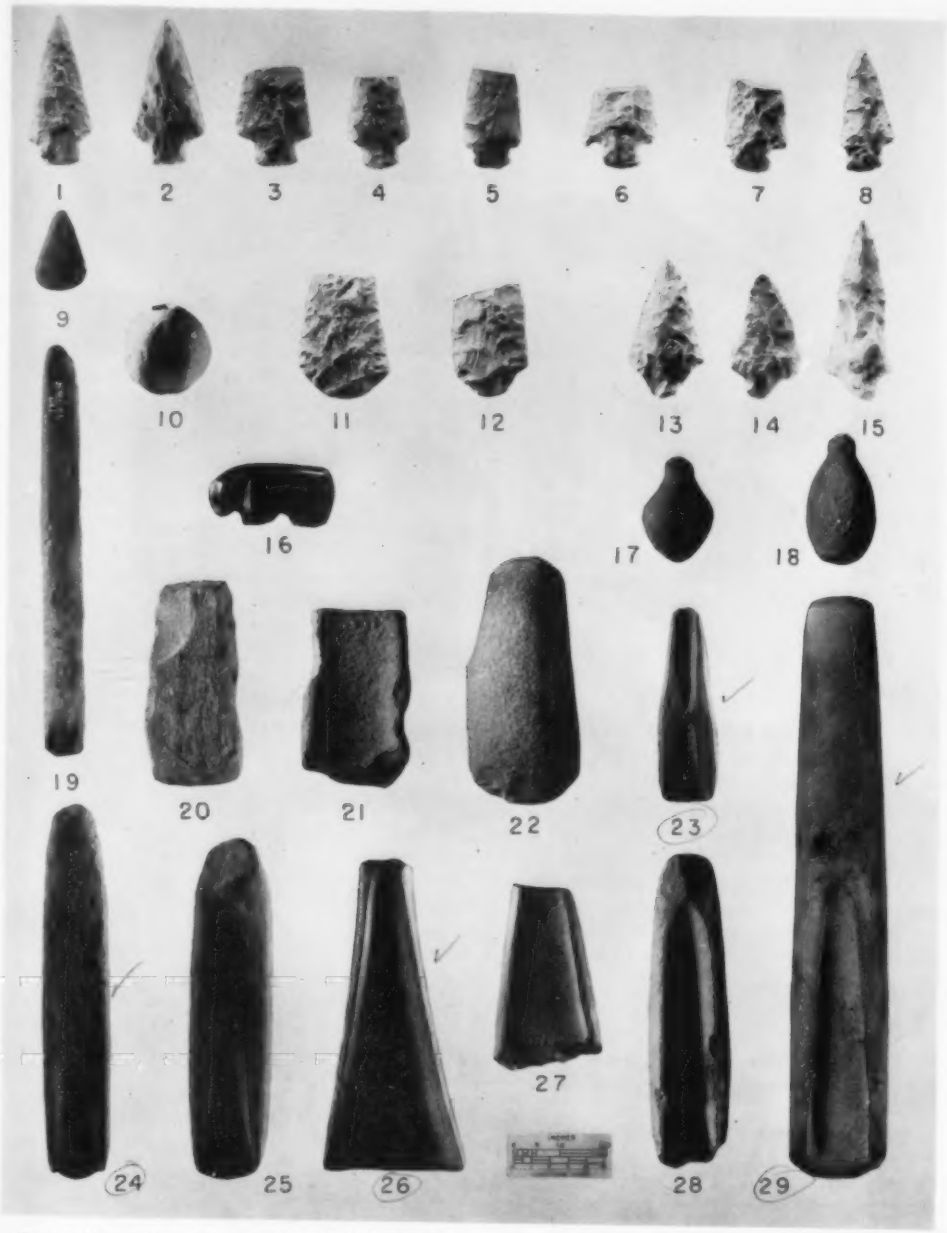

FIG. 3. Objects from Late Boreal Archaic levels at Ellsworth Falls, except *23*, *24*, Steven's Cemetery; *26*, Passadumkeag Sand Pit; *29*, Emerson's Cemetery. *16*, "bear" effigy, is reduced only half as much as the other specimens; it may belong with Early Boreal Archaic.

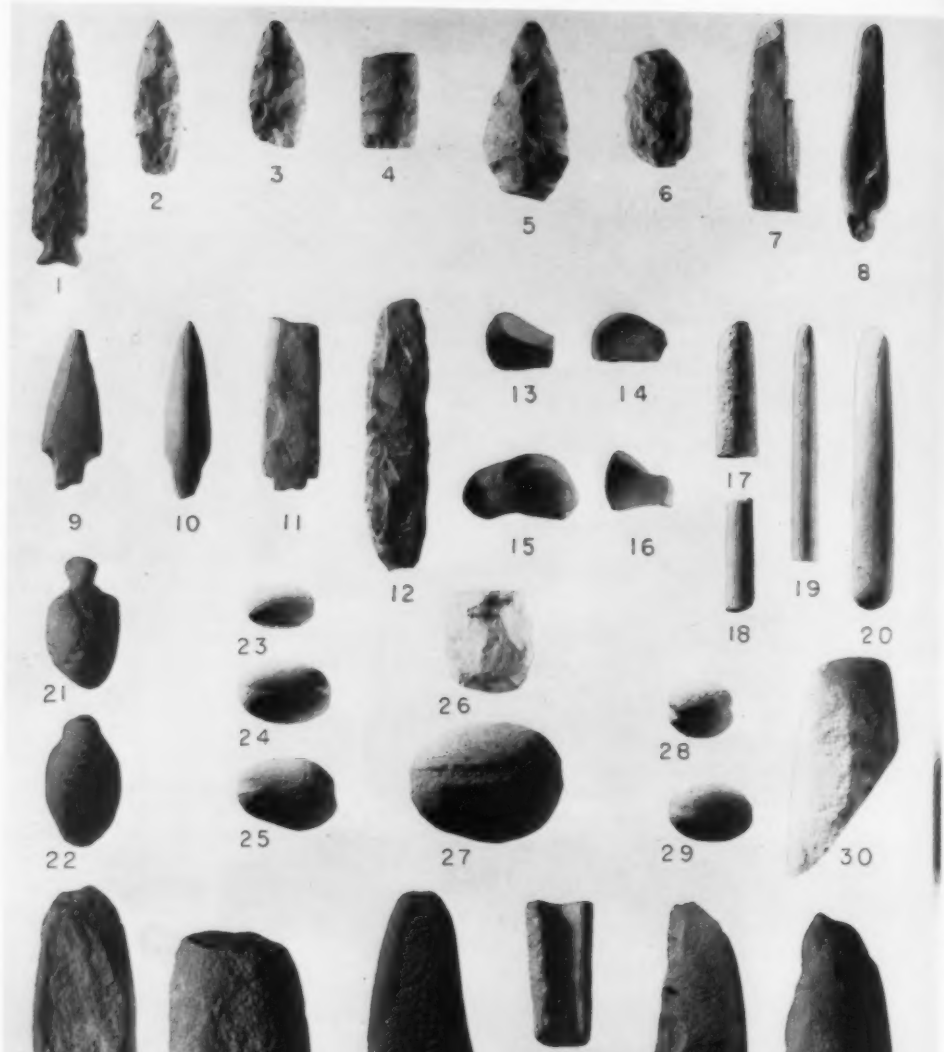

FIG. 4. Objects from Early Boreal Archaic levels at Ellsworth Falls. *7, 8, 13-16,* whetstones; *9-11,* polished slate points; *12,* may be a blank for a slate point; *17-20,* stone rods; *23-25, 27-29,* "bolas stones"; *26,* chipped adz with polished bit; *34,* fragment of gouge; *30-33, 35, 36,* adzes. *28-30* found together in lowest level, but near evidence of disturbance.

tural distinction is of no great importance. At the time when the notes cited in the footnote were published, Occupation 1 had not been distinguished from Occupation 2, and for this reason the material about to be described was not separated from the horizons with polished stone.

Occupation 1, here designated the Kelley phase, was present only at Smith Farm. It was the deepest and oldest evidence of occupation that we found, and it occurred a foot and more below the sample dated as M-89. It has not yet been dated. The Kelley phase (Fig. 5) is represented by implements that are percussion flaked, possibly by striking the implement on the anvil. Several kinds of rock were used, the most common being a porphyritic felsite like that at Mount Kineo. Several exposures are known in central Maine, and boulders and pebbles of this felsite are common in the drift. The industry appears to be a pebble industry. The sample is not large, but we have a number of implements and many primary chips, none showing any sign of modification.

One large leaf-shaped knife (Fig. 5 *9*), attributed to this level, is the only biface chipped implement from the Kelley phase excepting the cores or "sinuous-edged knives" described below. Large and heavy implements suggest nothing so much as oversized scrapers (Fig. 5 *1-5*). Their flat ventral surface may be formed by removing a spall from the original pebble. The dorsal surface may retain some of the cortex of the pebble. An edge is formed across the front by removing flakes by blows from the ventral surface. The back is trimmed off by a series of blows. These scrapers parallel in many ways implements associated with the Topanga culture of California and "Desert cultures" of the Southwest, and were they found there they would be accepted as "pulper planes." Another class of implement (Fig. 5 *7, 10-13*) is a core which has been shaped by percussion, with an edge formed by striking chips alternately from each face. This class also has its parallel in "sinuous-edged knives" of "Desert cultures." One or two flakes have a coarse retouching along one edge, as if to make scrapers (Fig. 5 *6*). Unretouched spalls, possibly knives or scrapers, show wear along one edge (Fig. 5 *16, 22*). Battered ends of otherwise unretouched pebbles (Fig. 5 *17, 18, 23*) betray their use as hammers, or perhaps anvils in the cases of the larger ones.

Although some pieces in collections from Quebec (Rogers and Rogers 1948, 1950; Johnson 1948) exhibit similarities to certain pieces from the Kelley phase, the over-all complexion of the Kelley phase differs in several respects from anything else from the Northeast that has been reported. Large implements resemble most closely core scrapers of the Topanga culture (Treganza and Malamud 1950), and some of the Cochise specimens, particularly those of the Chiricahua stage (Sayles and Antevs 1941: 18, 19, Pl. 10). I have not been able to find parallels to the large scrapers and "sinuous-edged knives" outside the Topanga and Desert cultures and those related to them.

Since grinding was not employed as a technique for forming tools, the Kelley phase should not properly be assigned to the Archaic stage. Instead it appears to belong with the Unspecialized Lithic. It appears to be the remains of one of the older occupations in the Northeast, but its temporal position is unknown.

The sequence at Ellsworth Falls enables us to formulate a hypothetical scheme of culture stages for northern New England and the Maritime Provinces. We are not here concerned with people of Specialized Lithic of Fluted Point tradition (Ritchie 1953; Byers 1954, 1955). Only two talc pendants from the Reagan site (Ritchie 1953, Fig. 89 *14*) which bear polished or abraded imitations of fluted faces give any indication that these little-known people ever made use of stone-grinding techniques. We have come to accept people of Specialized Lithic of Fluted Point tradition as the earliest inhabitants of the Northeast, but until we can find some means of dating them, we must also admit that they could easily have been backward barbarians seeking a refuge area.

In the Kelley phase, possibly next oldest, possibly older, we see no indication of weapons of any sort (Fig. 5). Presumably these people relied heavily on perishable weapons and implements of bone and wood, in which case it is evident that only the primary tools of stone have survived. Because of the unique position of this collection in the Northeast, it is impossible to assess the status of a group whose remains come closer to qualifying as Unspecialized Lithic (Johnson 1956) than do those of any other people in the area. It is possible that remains of Unspecialized Lithic cultures will be found widely distributed in the East. We shall have to consider George Lake (Greenman and Stanley 1943), Sheguiandah (Lee 1954,

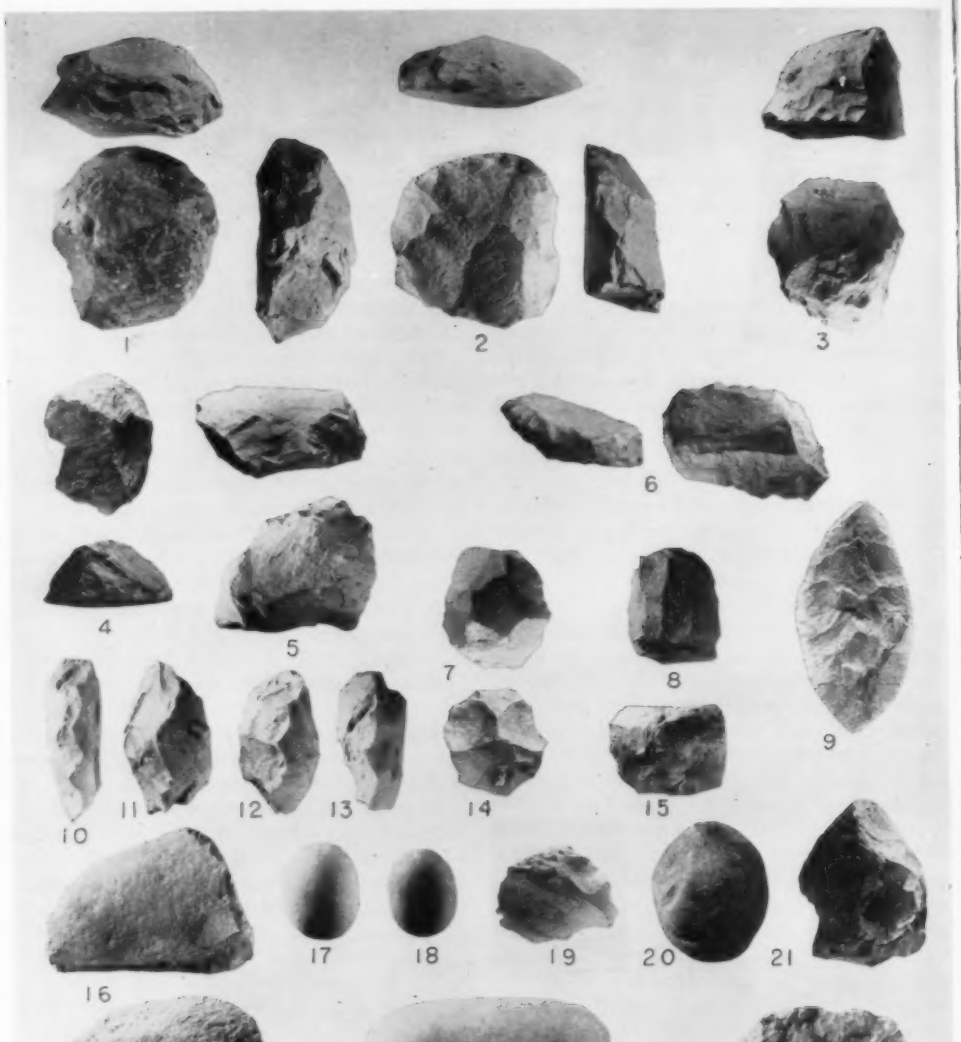

FIG. 5. Objects of the Kelley phase at Ellsworth Falls. *1-5*, large scrapers; *6*, scraper; *7*, sinuous-edged implement used as hammer; *8*, core; *9*, knife; *10-14*, sinuous-edged implements; *15*, *17-21*, pieces used for hammering; *16*, *22*, *24*, coarse scrapers or knives; *23*, hammer or anvil.

1955, 1957) and some of the sites reported by Rogers and Rogers (1948, 1950) for inclusion in this stage. The DeTurk complex, and others discussed by Witthoft but not yet published, may perhaps be included also. E. D. Prey I appears to preserve vestiges of the chipping technique, but presence of projectiles argues for placement of this site in Early Archaic. DeTurk and similar complexes in Pennsylvania, E. D. Prey, the Kelley phase, George Lake, and possibly Sheguiandah probably fall in an ill-defined "shadow zone" bridging the gap between Unspecialized Lithic and Early Archaic. While the Kelley phase appears to fall closer to Unspecialized Lithic, DeTurk perhaps belongs midway, and E. D. Prey on the Archaic side of the zone. Nothing has been found which would suggest any contact between people of a Specialized Lithic stage, and the authors of the Kelley phase. On the other hand, some of the larger and coarser chipped implements from sites of an Archaic or more advanced horizon show certain similarities to some artifacts of the Kelley phase.

Early Boreal Archaic is represented by Occupation 2 at Ellsworth Falls (Fig. 4). In this hypothetical stage, hafted and swung implements such as adz and gouge are usually made from pebbles or from blanks chipped into shape; both preliminary forms are then pecked as need dictates, while the edge is finished by polishing. Some pieces are chipped and then polished without resort to intermediate pecking. Piercing and cutting weapons include polished spears (Fig. 4 *9, 10*) and chipped stemmed or side-notched implements of such size as to suggest that they were used on thrusting weapons or javelins. It may be inferred that a large proportion of tools was made from bone. Longitudinally grooved or end-notched pebbles may represent weights for the bolas, although they are quite unlike the Patagonian bolas stone illustrated by Parker (1922, Pl. 10 *1*). The purpose of stone rods which occur in this horizon and probably in Late Boreal Archaic, also, has never been adequately explained. They suggest the "slate pencils" of the Early horizon in central California but are somewhat heavier (Heizer 1949: 23, Fig. 15). Plummets are also found in both Early and Late horizons. They, too, have their parallels in California (Heizer 1949: 18, Fig. 9 *h*), as well as elsewhere in eastern North America.

Our hypothetical Late Boreal Archaic (Fig. 3) carries on techniques in vogue in Early Boreal Archaic. Chipped implements, which are more numerous in this horizon, were shaped by preliminary percussion, and finished by either indirect or carefully controlled percussion. A few thumbnail scrapers and larger keeled scrapers appear here. Drills or perforators with expanded and side-notched base are known also. Larger chipped implements include a series of knives with excurvate bases that show only the faintest trace of shouldering at each edge, with a delicate sharp point on the shoulder. There are also points with stems of a variety of shapes, including the side-notched, although the parallel-sided rectangular stem is the most numerous (Fig. 3 *1, 2*). The last-named may have reached this area as armament for javelins hurled with spearthrowers weighted with bannerstones.

It is probable that Maine and the Maritime Provinces came under rather strong influences from peoples of Late Archaic horizons living to the south and west, for we find not only bannerstones in at least two forms, but semilunar knives as well. It is significant of the recent introduction of the latter implement that none has ever been reported from a grave of the Moorehead complex. A fragment of a semilunar knife found in the 1946 season at Smith Farm probably came from the Late Boreal Archaic horizon. Other specimens have been found scattered throughout the state, but none have been in a dateable context. These influences probably account also for two stone tubes, one with a blocked end, found by Moorehead (1922: 46, 49, Fig. 28) at Mason's Cemetery in graves 116 and 117 which he described as "intrusive" and for a pop-eyed birdstone from Washademoak in the New Brunswick Museum.

In Late Boreal Archaic horizons, gouges may be polished over the entire surface, although such implements polished only on the bit may also be found. The acme of perfection in polished tools is the magnificent specimen from Emerson's Cemetery (Fig. 3 *29*; also Moorehead 1922, Fig. 44 middle). Double-ended tools and combination tools (Fig. 3 *23*) probably belong in Late Boreal Archaic horizons, but as none has ever been found in a habitation site it is impossible to be specific. It is quite possible that the more highly finished plummets also are products of Late Boreal Archaic artisans.

Late Boreal Archaic was the foundation on

which the later cultures were built. Upper levels at Ellsworth Falls have been disturbed in several ways and during aboriginal occupation the people must have had the inconsiderate habit of walking through their own rubbish. Potsherds from the Smith Farm are too small to be of much value in subdividing Occupation 4. We do know that a chipped and polished adz, a fragment of a gouge, and pecked and polished adzes were found in levels containing potsherds of Point Peninsula tradition. Thumbnail scrapers become legion in this stratum; side-notched points increase in number, and size of point decreases. We find no plummets ascribable to this horizon. Although the complexion of the collections from Occupation 4 exhibits changes, many familiar forms survive. There is no disconformity.

Because Ellsworth Falls was a fishing station at the falls of a river, the complement of tools used there may reflect only this activity. It is possible that hunting stations and seaside camps, where other activities were pursued, might yield a very different set of implements.

Thus the site on Moose Island, discussed by Kingsbury and Hadlock (1951), displays a roster of chipped implements which is not reflected at Ellsworth Falls, except to a small degree among some of the chipped points. The fragment of polished adz (Kingsbury and Hadlock, Pl. 1 *b* 3) suggests Late Boreal Archaic, and the stemmed and side-notched points confirm such an assignment.

Lower levels of the Waterside (Rowe 1940), Taft's Point (Hadlock 1939) and Nevin shellheaps (R. S. Peabody Foundation, unpublished) almost certainly equate with Occupation 3, and therefore belong in Late Boreal Archaic. They contribute bone tools, including a variety of barbed forms, worked beaver incisors, clear evidence of the importance of fish in the occurrence of layers of scales, and also evidence of development of a maritime aspect of the culture. This occurs in the form of fragments of swords of swordfish, and implements made from swords, which were found in all three heaps. Fragments of swordfish sword have been found in other heaps as far removed as Cape Cod, but I have been able to find such remnants only at sites which otherwise show evidence of occupation by people with an Archaic culture. No evidence of swordfishing has been found in later sites.

The Moorehead Complex

The Moorehead complex, widely known as the Red Paint culture, is too well known to need further exposition. It is possible that careful analysis might have demonstrated some chronological differences, but as the collections are no longer complete, such an undertaking at the present time is of no value (Johnson 1937: 162). Connection of this manifestation with Late Boreal Archaic cannot be questioned, and its roots probably spring from Early Boreal Archaic. Since artifacts found in graves are frequently of such soft or friable materials that they will not withstand heavy use, it is evident that the complex became a mortuary one, concerned with cultic burials under certain formulae. Since some typical Moorehead complex implements were taken from the upper layers of the Nevin shellheap, it is possible that the cult survived for a short time after the introduction of pottery of Point Peninsula style. On the other hand, these pieces may have been dug from the lower levels of the heap by the late inhabitants of the site. Such objects are unknown from shellheaps believed to be later.

Although cultic burials seem to be confined to an area bounded on the west by the Kennebec watershed, on the north by the Passadumkeag drainage, and on the east by the east side of Frenchman's Bay, implements typical of the Moorehead complex are scattered widely throughout northern New England and adjacent parts of the Maritime Provinces. Moorehead (1922: 208, Fig. 108) illustrates two such gouges and a bannerstone from Durham, New Hampshire. In spite of the lack of success of the Moorehead survey of 1914, Joseph Crocker was able to secure a large collection of artifacts of forms typical of the Moorehead complex from the St. Croix waters near Vanceboro. After Crocker retired from the Customs Service he moved to Stillwater, Maine. At the time when I examined his uncatalogued collection at Crocker's home in Stillwater, it included several forms not typical of the Moorehead complex; the means by which they came to be in the collection is not clear.

Artifacts of the Moorehead complex have been found as far west as the headwaters of the Androscoggin River in Umbagog, Mooselucmeguntic, and the Richardson lakes. Several collections comprising plummets, gouges, and adzes are known from this area, but the collection from Umbagog Lake now in the R. S.

Peabody Foundation (Sargent 1954) makes it clear that they are associated with an entirely different series of chipped forms, and with implements which Moorehead did not include in his "persistent traits."

The same situation holds true for the plateau of northern Maine. Within recent years, Milton B. Hall and Wendell S. Hadlock have discovered evidence of occupation on nearly every lake which they have examined in that area. Moorehead missed all of the sites along his routes, probably due to high water when he was there. A preliminary report is now being prepared. Adzes and gouges and some typical chipped forms are found there, but so far no plummets or bayonet slate points have been discovered. On the other hand, there are a half dozen semilunar knives, an implement unknown from the Moorehead complex. While the archaeology of the plateau has scarcely been scratched, there is enough evidence to show that the region has been occupied, at least seasonally, for a very long time. Several well-known routes from the St. Lawrence to the sea lead through the area, but skirt the plateau, and follow the Kennebec, Penobscot or St. John to the Atlantic.

In the New Brunswick Museum, St. John, New Brunswick, there are objects typical of the Moorehead complex. All are from New Brunswick, and while a large slate point is from St. Leonard, most of the pieces are from the lake region of the lower St. John and the Washademoak. Ground slate points include long ones with hexagonal cross section, short broad ones with notches rubbed into the stems (Parker 1920, Pl. 18, *1, 4*; Willoughby 1935, Fig. 32 *a*) and some fragments of typical bayonet forms with hexagonal cross section and either broad or tapering tang. Of the latter, one (No. 5257) bears incised hachuring on the beveled edges. Plummets occur there, along with adzes and gouges. The gouges include several with long deep channels, some of which run the entire length of the implement. This form of gouge is known from the Moorehead complex although it is by no means common (Willoughby 1935, Fig. 19 *b*). Grooved axes like those from southern New England, with ridges on either side of the groove, and a pop-eyed birdstone found on the Washademoak, give evidence that influences from far afield reached New Brunswick. A subrectanguloid soapstone vessel found near Oromocto is a typically southern form, although it is geographically closer to the Newfoundland soapstone quarries.

Gouges, adzes, plummets, grooved axes, and slate points, including bayonets, have been found along the southeast coast of Nova Scotia. These are discussed and some are illustrated by Piers (1889, 1896); some are in the Nova Scotia Museum of Science at Halifax.

Between the lower St. John and the center of development in Maine lies Washington County, where numerous finds of isolated specimens have been made and a number of small sites are known. We have already alluded to the Crocker collection from the neighborhood of Vanceboro. Collections in the U. S. National Museum reflect the distribution of Late Boreal Archaic through the lower St. Croix waters, and a cache from Dennysville collected by Benjamin Lincoln is generally attributed to this occupation. A field party from the R. S. Peabody Foundation made excavations in a site on the Dennys River not far from Dennysville, and examined a number of private collections obtained from it. It had produced slate points, including typical bayonets, adzes, gouges, plummets, a fragment of an elongate grooved ax, and a grooved arrowshaft smoother. These occurred together, below a buried soil profile, under circumstances which indicate contemporaneity beyond doubt. With them are found some rather peculiar isosceles trianguloid points with small side notches set well above the base. Placement of the notches is reminiscent of that of notches on trianguloid side-notched knives (Type 3 *b*) from Dorset sites in Newfoundland (Harp 1952: 69, Pl. 6).

The Far Northeast

Turning to Newfoundland, Labrador, and Quebec, we shall make a hasty review of discoveries in search of traces of Archaic cultures. It was Willoughby's (1935) contention that the people whose implements we classify as Late Boreal Archaic spoke a language related to that of the Beothuck of Newfoundland. The links with the Beothuck were extremely tenuous. Willoughby (1935: 15) mentions finds of "adz blades of various types, chipped knives, scrapers and projectile points, polished slate points and a few pear-shaped pendants, types found abundantly in the ancient graves and in the fields throughout New England." Harp (1951: 218) points out the fact that the archaeology of the Beothuck is by no means well

known, that people other than the Beothuck have lived on the island, and that the few collections made from known Beothuck sites of the contact period do not include "the types of artifacts which, when procured elsewhere, have been attributed to this people." Harp (1951, Figs. 66, 67 *b*) illustrates implements which would not be out of place in sites of the Moorehead complex in Maine. Clearly, Harp's Newfoundland Aberrant (1952: 260-92) and sites in southern Labrador (1951: 205-12, Fig. 66) constitute further expressions of Boreal Archaic. Without larger collections it would be impossible to place them definitely as either Early or Late, although the presence of stemmed and side-notched projectile points of intermediate size seems to indicate Late Boreal Archaic.

In the same way, objects typical of Boreal Archaic are included in the Old Stone culture in Labrador (Strong 1930). This collection is now in the R. S. Peabody Foundation in Andover. Although some of the pieces (Strong 1930, Pl. 5 *d*, 4 *i*) are so badly weathered that some of us might disagree with Strong's identification, there can be no doubt about the partially polished adzes from Windy Tickle (Strong 1930, Pl. 5 *e*, *f*) which are completely at home in Boreal Archaic. Here, again, the chipped points include forms that occur in other sites classed as Late Boreal Archaic, and in fact many of those illustrated in his Plate 3 would be at home in late Archaic horizons throughout much of the Northeast. Chipped semilunar knives (Strong 1930, Pl. 4 *g*; Harp 1951, Fig. 67 *b 2*) are known from surface collections in northern New England, but I do not know of any that were excavated under controlled conditions. The pieces illustrated by Strong (1930, Pls. 3 *a*, *b*, *d*, *f*, *g*, *m*; 4 *a*, *g*) are made of a translucent chalcedony similar to that used for those shown by Harp (1951, Figs. 66 *a 2*, 6; 67 *b 1*, *2*) and Willoughby (1935, Fig. 31). No one has yet found the source, but the material has been distributed widely, possibly by the eastern lobe of the Labrador ice.

A series of three canoe traverses made by Edward S. Rogers with Murray H. Rogers and Roger A. Bradley during the summers of 1947, 1948, and 1950 has shed some light on an area of approximately 65,000 square miles between James Bay and the Saguenay. As Johnson (1948) has said, the wonder is that we have anything from this almost unknown country. Soils are almost nonexistent except in small pockets, and there is no stratigraphy. The materials brought back by Rogers come down to contact times (Rogers and Bradley 1953, Fig. 55 *13*, *15*). How far back in time they go it is impossible to say. Johnson (1948) makes some keen observations concerning the 1947 collection; the same remarks could apply to much of the 1948 collection. One difference lies in three sites on the eastern and southern fringes of the area which produced chipped and polished tools. A few polished tools were found during the 1950 trip, also in the southeastern part of the territory. It appears likely that inspiration for the manufacture of polished stone tools was lacking in the northern district — either they did not fill any need, and therefore were not taken into that country, or people who lived there had not learned about them. The Burger collection, which includes gouges, adzes, and other implements characteristic of Boreal Archaic, is from Kempt and Manuan lakes, to the south of Rogers' traverses (Burger 1953).

Although Johnson found nothing in common between the Rogers' 1947 collection and the Strong collection from Labrador, the chipped and polished adzes found during the 1948 and 1950 trips (Rogers and Rogers 1950, Fig. 108 *23*; Rogers and Bradley 1953, Fig. 55 *25*), like Strong's from Windy Tickle, clearly belong in Boreal Archaic, as do fragments of gouges (Rogers and Rogers 1950, Fig. 108, *34*; Rogers and Bradley 1953, Fig. 55, *19*). The scattering of side-notched points suggests that the occupation may have been late. As we have noted, the sites are thin; they are often so situated as to be natural stopping places. There is no guarantee that projectile points of late types were not dropped by a casual passenger whose visit was not connected with other occupations.

Tadoussac lies at the mouth of the Saguenay, and the collections from that site might be expected to reflect Rogers' discoveries. In the collections from Tadoussac there are a number of chipped and polished adzes (Wintemberg 1943 Pl. 25 *D*) which are less finished than Rogers' specimens, but perfectly acceptable as Early Boreal Archaic types. The outline of some of the knives appears to duplicate that of knives in the Rogers collections, but, as Johnson (1948) has pointed out, techniques used in manufacturing the two groups of implements are quite distinct. Of the heavier implements, many seem to be only partly finished, and it is therefore difficult to compare them with finished tools.

However, the slate shafts (Wintemberg 1943, Pl. 25 *D 10*), the sawed slate, and the slate point all occur in Boreal Archaic. Sawing or cutting by running a sharp stone repeatedly on the same track is applied to slate or to bone, indiscriminately, by peoples of Boreal culture. It is not possible to place Tadoussac definitely in either the early or the late subdivision. The collections appear to have been gathered from more than one part of the site, and may be mixed. However, only one stemmed projectile point (Wintemberg 1943, Pl. 25 *B 1*) is recorded from the site although another is said to have been picked up by a tourist. The Tadoussac collection includes no chipped implements to reflect the forms of implements from Ellsworth Falls, except for this one point. Some of the knives resemble knives from Moose Island, but the near absence of stemmed or side-notched points from Tadoussac argues for Early Boreal Archaic.

This covers practically all the archaeological information about the far Northeast. To the south there is more information, although little has been published on which one can base an hypothesis. The Farquar Lake cache of Old Copper implements (Popham and Emerson 1954) is outstanding. Frank Ridley's Frank Bay site (Ridley 1954) with its distinctive Mattawan complex has been dated at 970 B.C. ± 300 years (M-363). On Lake Timiskaming, Ridley (1954: 43) has found artifacts similar to those of the Mattawan complex *underlying* a dark stratum that contained "artifacts tentatively identified as Archaic, resembling Atlantic states Archaic, and Indian Knoll." Ridley also reports material "similar to that from western New York" scattered around Lake Nipissing and much of southern Ontario.

The late date of the Mattawan complex, and therefore the late position of the Archaic horizon in this area, presents certain problems. The Mattawan complex, in spite of Ridley's feeling that it shows parallels with paleo-Indian sites, with the Rogers' collection from Quebec, and with Dorset stations, appears to be of a new strain. The blade-and-core tradition represented at Frank Bay and Lake Timiskaming (Ridley 1956) may be a recent introduction from the north, where MacNeish (1951, 1953, 1954, 1955) has reported a parallel industry which could only have come southward from the Northwest Territories after glacial lakes had retreated. Another possibility is that Mattawan represents a very backward tarriant of paleo-Indian tradition. The latter seems most unlikely. It appears much more probable that the blade-and-core implements of the Mattawan complex represent a southern extension of a tradition which has its roots in mesolithic horizons of the Old World.

In any event, we find Boreal Archaic on the Atlantic seaboard at a time which antedates the Mattawan complex by a good millenium, and we are therefore forced to conclude that the route by which it entered the Northeast lay south of the Great Lakes or else along the Arctic littoral, a route which seems improbable if only because of lack of the characteristic implements at early times. Means of connecting it with archaeologic cultures of the Old World have yet to be found in spite of such obvious parallels as those noted by Spaulding (1946). It may be that they will never be found because of substitution of some other medium for relatively imperishable stone or by reason of changes in strand lines. A paper chase with a disappearing trail will be a hard one indeed.

It may not be amiss to stop for a moment to consider an Eskimo culture with artifacts that show marked similarities to some from Late Boreal Archaic sites. The report on the Kaflia site on the east side of the Alaska Peninsula (Oswalt 1955) and de Laguna's study of the archaeology of Cook Inlet (de Laguna 1934) make it clear that something very close to Boreal Archaic was in existence in southern Alaska at about the time when Columbus was setting out on his historic voyage. The people who lived on Cook Inlet and at Kaflia made and used double-edged and single-edged slate blades which duplicate some of the forms from the Northeast. They used, as well, chipped knives, arrowpoints, lance blades, and adzes chipped and ground only at the bit. Their plummets, longitudinally grooved or notched pebbles, and spall scrapers or boulder flakes, again, are practically identical with eastern Boreal Archaic forms. Oswalt (1955: 43) believes that "the Kaflia site was occupied by Eskimos for a few hundred years shortly before the first historical contact in this general area at A.D. 1761." This late date, in comparison with the dates for Boreal Archaic remains at Ellsworth Falls, calls for careful explanation.

If one pleads tarriance, a slow, northward retreat along the edge of the taiga, during which the culture is preserved for more than two millenia with very little change, one must in-

voke the substitution of perishable for imperishable materials for the manufacture of implements in order to fill the unbridged gap where none are known. If one refuses to recognize the fact that wood or bone can be used for piercing and catching weapons, and that bone can be used for implements to fill needs commonly satisfied by stone forms, he faces two alternatives: either he may admit ignorance of archaeologic remains along the hypothetical route by which culture spread and postulate the existence of as yet undiscovered sites, or he may invoke seemingly independent development of identical forms out of the great cultural reservoir which was the heritage of boreal peoples. It may be that boreal cultures are based on traditions so deeply rooted that parallel needs give rise to parallel forms made from the most readily available material. Although such a concept may reconcile occurrences of similar forms of implements in widely separated parts of the world, it does not preclude the possibility of stimulus diffusion.

Regional Expressions of the Boreal Archaic

To return to the Northeast, we note that forms that we have utilized as guides in determining stages of Archaic culture are usually the larger implements, and that they may appear with chipped stone tools of more than one category. For example, the chipped stone industries of northern New England and southern New England are quite different. Gouges, adzes, some plummets, and a few slate points are known from southern New England. The inference is that they appear as an increment to a local tradition of stone working. Boreal Archaic implements found by Sargent (1954) on Lake Umbagog are in association with chipped implements that belong to an industry which is quite distinct from that of the region about Penobscot Bay. In the same way, the chipped stone forms in Washington County, Maine, differ in details from those about Penobscot Bay. It is conceivable that the chipped forms represent a basic industry developed in remote times from some proto-Archaic beginnings and persisting as locally individual forms of tools, confined to each drainage area, the territory of one group of people, while new and specialized implements, techniques, and work habits came in without affecting this basic equipment. A group of tribes whose lives conformed to the general boreal pattern would make use of implements of the same general character in the course of parallel activities, but individual tribes might develop implements to fill needs peculiar to each environment. The relative importance of kayak and dogsled in the several subareas of Eskimo culture is a living example of such selection.

On a larger scale the same principle applies to the entire Boreal Archaic. This would include Frontenac, Brewerton, Vosburg, Vergennes, Tadoussac, the Moorehead complex, Newfoundland Aberrant, and the Old Stone culture of Labrador. All show points in common. They are as familiar as a contemporary class picture from another school — the clothes and poses are familiar, but the faces are different.

Reference to the bar graphs published by Ritchie (1944, Pl. 165) reveals the marked differences between Frontenac and Brewerton in spite of the fact that the graphs are in terms of actual frequency rather than percentages. Unfortunately, figures for frequency of forms found at Vergennes or on Vosburg sites are not available, but Bailey (1939) publishes a few figures and percentages. It would be impossible to set up a graph valid for all sites without studying the collections, and this also would be necessary in order to reconcile type designations. In some instances Ritchie's plates show that a single type, according to his system, includes forms which are here placed in separate categories. Since publication of his *Pre-Iroquoian Occupations of New York*, Ritchie has changed his views about the relationship of some sites, and distinguished components at some of them (1951). It becomes apparent that the Robinson and Oberlander sites are not only separate entities but that both were occupied not only by people who did not make pottery, but also by those who did. Inevitably some mixing must have introduced forms into levels where they did not belong.

These graphs, nevertheless, show that there is a marked difference between the Brewerton sites and Frontenac in respect to preferred forms of projectile points and, indeed, almost every category (Ritchie 1940, 1945). If Bailey's data (1939) for the Donovan site, near Vergennes, are included, one finds still greater differences. For example, small triangular points with straight to concave bases constitute more than half of the projectiles from the Donovan site, while this form is lacking from the Brewerton sites and Frontenac Island. By the same

token, fragments of nine semilunar knives are reported from the Donovan site, while only one chipped one is known from the Oberlander 1 site. This implement is reported in collections from Vosburg sites; its frequency is not given.

In the thrusting group we note polished slate points, one with notched stem and one with straight stem at Brewerton (Ritchie 1944, Pl. 148, *19, 20*), while one fragmentary barbed point and what Bailey believed to be a fragment of a bayonet with hexagonal cross section were found at the Donovan site.

Six different forms of bannerstones occur in sites of the Brewerton phase; two of these are represented by two specimens. Four of these forms are duplicated in the Vosburg phase, and the ovoid form which we have met in southeastern New England and the Moorehead complex may also be present — the reference is not clear (Ritchie 1940: 94; 1944: 259). Fragments found at Vergennes on the Donovan site may represent the semicircular bipennate form. Plummets occur at Brewerton and at Frontenac, while one belongs to Vosburg.

Enough detail has been presented here to show that this is no package deal. Problems are not made any easier by the system of classification which Ritchie uses. For example, his class of narrow stemmed points (Ritchie 1944, Pl. 147, *1-14*) comprises three forms that I would place in separate groups; his broad side-notched points (Ritchie 1944, Pl. 147, *30-42*) comprise four. Some of the individual items can be connected with Coastal Archaic, particularly some forms of bannerstones and some of the chipped points. One suspects that the Donovan site may belong in a time horizon different from those of Frontenac and Brewerton because of the difference in size of projectiles and the presence of trianguloid forms. Potsherds at the Donovan site may well belong with the stone implements, and may not be a late addition to the site.

Within the inventory of the Frontenac, Brewerton, Vosburg, and Vergennes phases there are artifacts which belong in the same category in which artifacts in the Moorehead complex belong. They are not identical forms. They represent accepted traits which were useful to people who rejected other traits of the Boreal Archaic. These accepted traits were then merged with traits which came from the south and east as well as the south and west to produce the mixture which we find in these phases. Reasons for the acceptance of some traits and the rejection of others are not at once evident. It may have been due to environmental differences. People in Maine developed some of these traits into forms which are quite distinct from those in New York — as an example note the different and elaborate forms of gouge. The gouges found in New York are the simplest forms; except for one long specimen from Oberlander No. 1 (Ritchie 1944, Pl. 116 *15*) they show no greater connection with Maine than they do with southern New England, where gouges are widely distributed.

Similarities between objects from the center in New York State and those from the eastern centers are of such a nature that I am inclined to think that the relationship can only be covered by a scheme such as that suggested by Phillips and Willey (1953). They contemplate components combined into phases because of "cultural uniformity amounting to practical identity." It is not possible to combine Frontenac, Brewerton, Vosburg and Vergennes in this way, because of striking disparities. They must therefore become *phases*, and I am inclined to feel that this is approximately the equivalent of their position under Ritchie's scheme. Perhaps this group of phases will eventually be ordered into some larger arrangement, but at present their relationship is not too clear.

The eastern center, with a climax in the area surrounding Penobscot Bay, is also composed of a number of phases. These phases are not yet clearly understood, but studies now under way should clarify a number of phases which correspond roughly to some of the local variations of Boreal Archaic which I have previously discussed. The Moorehead complex may consist of a tradition. It almost certainly persisted for a relatively long time.

I see no way of tying the eastern center to the western center except through some loose connection such as can be offered by a Boreal Archaic stage. Since we have already divided the Archaic stage into a number of regional expressions we may solve the difficulty by suggesting a Maritime Boreal Archaic and a Laurentian Boreal Archaic.

THE POSITION OF LAMOKA

Lamoka has been excluded from this discussion because it does not belong in the Boreal Archaic. To begin with, the bone industry of

the Lamoka phase exhibits marked parallels to the bone industry of many Kentucky Archaic sites. The notched antler pendants and pendant-like artifacts (Ritchie 1932b, Pl. XI 5, 6; 1944, Pls. 161, 162) find parallels in the Ward site (Webb and Haag 1940, Fig. 24), the Annis Mound (Webb 1950b, Fig. 14 *D*), and possibly in the Read Shell Midden (Webb 1950a: 383, Fig. 6 *A*). The rodent incisor mounted in a bone shaft (Ritchie 1932b, Pl. X 5; 1944, Pl. 160 *40*) is duplicated at Indian Knoll (Webb 1946, Fig. 49). Fish hooks, bone awls, points with shallow side notches, whistles, and in fact most of the bone industry of Lamoka has such close parallels in Kentucky that there is no denying a common inspiration.

Chipped stone implements are not duplicated between the two areas, although there are some forms in each which are reminiscent of the other. As I have previously suggested, the side-notched chipped implements of the Lamoka phase are at home in Coastal Archaic. It seems probable that Lamoka represents a blend of Kentucky Archaic — a generalized Indian Knoll focus — and certain elements which found expression in Coastal Archaic. Where and when this blend occurred is not yet known. Since the Upper Ohio Valley Archaeological Survey has not come up with a definitive answer, we must, perforce, continue to search. Absence of bannerstones from Lamoka suggests that the people who contributed the bone industry to Lamoka and those who developed the classic Kentucky Archaic had separated before the spearthrower with winged weight was developed.

The beveled adz which is characteristic of Lamoka has been reported from from sites in the Upper Allegheny (36Fol, 36Fo3, Mayer-Oakes 1955: 53, Pl. 13 C), and Douglas Jordan has drawn my attention to others from the Beaver drainage (33Mh4, 36Me6, 36Lr2, Mayer-Oakes 1955, Pls. 27 *H*, 28 F, G), close to the fringes of the distribution of Lamoka (Ritchie 1944, Pl. 153). Although beveling is applied to adzes of the Moorehead complex, their form is quite distinct from that of the Lamoka beveled adz. A fragment of an adz found on Moose Island (Kingsbury and Hadlock 1951, Pl. 1 *b* 3) does not have the characteristics of the Lamoka tool. Inspiration for the latter may have come from early contacts with people of a Boreal Archaic stage. Whatever its source, this inspiration resulted in an implement that is not only unique, but also perfection in craftsmanship.

The position of Lamoka in the Northeast has long been unique, and the material culture has appeared somewhat out of place in that area. In view of similarities between Lamoka and sites in Kentucky, to which we have already alluded, it seems possible that Lamoka was the means by which the Iroquoian tongue was introduced into a region otherwise occupied by speakers of Algonkian languages.

Summary

We have seen that complexities in the archaeology of the Northeast may be due to a series of conflicting, merging, and stimulating streams of culture, one from the south coming up the coast, one from the west, perhaps coming along the edge of the taiga, while a third brought Lamoka from the region of Kentucky into New York. At least two of these streams continued to the ethnographic present, bringing into the area traits which have been utilized by archaeologists and ethnographers. Linguistic ties which bind the Algonkian speakers of the southern coasts of New England to their fellows to the south and to the west are in themselves significant of the importance of this pattern of culture growth. Whether a valid connection can be demonstrated between linguistic subdivisions and ethnographic traits, on the one hand, and archaeologic expressions on the other, still remains a problem for the future. The antiquity of the pattern gives some hint of encouragement.

Robert S. Peabody Foundation
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MODOC ROCK SHELTER
AN EARLY ARCHAIC SITE IN SOUTHERN ILLINOIS

MELVIN L. FOWLER

ARCHAEOLOGICAL sites to which the rather indefinite term Archaic has been applied have been known from various areas throughout the eastern United States for a good number of years. At the outset, these sites were defined as Archaic primarily by their lack of evidence for agricultural practices and pottery, although more positive traits were also used in such definitions. The term Archaic has now come to be used in two major ways: as a time period in a local sequence, and as a cultural stage in general preceding the development of agriculture and settled communities. Willey and Phillips (1955: 740) have used the term Archaic as a technological stage in which polished stone tools are diagnostic although they also use other characteristics in their definition. It seems to me that on the basis of recently accumulated data we might broaden the concept of the Archaic stage to include more than nonagricultural groups using polished stone implements. Sites designated as Archaic usually produce artifacts which indicate that gathering played an important part in subsistence. On the other hand, sites classed as Early Hunter — paleo-Indian or Early Lithic — usually contain artifacts which reflect a dependence on the hunting of large animals.

Therefore, in addition to the concept of the Archaic as a technological stage it should be understood that I include adaptation to and utilization of *local* fauna and flora and a subsistence highly oriented toward collecting (Willey and Phillips 1955: 740-4). This is not to say that the Early Hunters ignored plant remains but merely points out that, to date, the bulk of the artifactual evidence indicates that big game hunting was their major pursuit. In light of one of the recent seminars in archaeology (Beardsley and others 1956) an additional dimension to this definition can be suggested, that of community patterning. The Archaic community would seem to fall into the category of Restricted Wandering or even Central Based Wandering, while the Early Hunters seem to fall more into the pattern of Free Wandering. The data seem to bear this out as Early Hunter projectile point styles of distinct forms have wide distribution, whereas in the Archaic stage there appear to be many local traditions (Fowler 1957).

The definition I prefer for the Archaic stage, then, is as follows: (1) cultures adapted to utilizing local flora and fauna and strongly oriented toward gathering as a subsistence pattern, (2) wandering over restricted area utilizing the various resources seasonally, and, in the eastern United States, (3) often having tool assemblages that include chopping tools suitable for woodland existence. It will be seen that this definition, broad though it is, is not too far removed from those suggested by others in these papers. The definition of phases and traditions within the Archaic stage is another matter.

THE MODOC ROCK SHELTER

Since the publication of the Modoc Rock Shelter preliminary report (Fowler, Winters, and Parmalee 1956) further excavations have been carried out which have added a great deal to the understanding of the site and have confirmed in general the conclusions of the preliminary report. The following summary of the total data from the site to date is based on a report now in preparation. The tabulation in this paper must therefore be considered as tentative subject to completion of the detailed report. Main attention is given to Zone I as this is the portion of the site that raises the most questions regarding the Archaic at Modoc.

First, a word about how the artifacts from the 1953 excavations are correlated with those of the 1956 excavation. The two areas excavated, though more than 150 feet apart, are under the same shelter and are part of the same site. The arbitrary datum used as control for the excavations in both areas established the following facts: (1) the original ground surface was at about the same height in both areas, and (2) Zone I was reached at the same depths (within half a foot) in both excavation areas. Thus, the artifacts from the corresponding levels in both excavations can be correlated. The deposits at the Modoc Rock Shelter are more than 27 feet in depth. Artifacts and evidences of human occupation were found in all levels of this site with the possible exception of a subzone to be mentioned in discussing Zone I.

During 1953 excavations the site was divided into five zones which are retained in this report as convenient analytical units; their significance is discussed under the appropriate headings. Zone V, the pottery-bearing uppermost 5 feet of the deposit, is excluded from this discussion.

Zone I

In the 1953 excavations Zone I extended from about 21.5 to 26.5 feet below the original surface; the 1956 excavations from 22 to 27.2 feet. Although bedrock was struck at this depth, auger tests show that the rock seems to step off to a lower level beyond the limit of excavation. Thus, portions of the site are probably even deeper than the presently defined Zone I. This zone is made up of two bands of apparently different deposition. The upper portion (22 to 24 feet) is silt that M. M. Leighton of the Illinois State Geological Survey feels was windblown from the valley flat which he postulates had just been denuded by the outlet flood waters of one of the late Lake Chicago stages (personal communication). This wind-deposited band is almost sterile of fire pits but had within it several artifacts. Below this, from about 24 feet down to the bottom of the site, is a band in which deposition appears to have occurred under conditions similar to those which were prevalent when material above Zone I was laid down. This band contains several superimposed fire beds as well as artifacts indicating human occupation.

Perhaps, then, Zone I should be divided into two parts which we will designate Subzone Ia (24 to 27.2 feet) and Subzone Ib, the wind-deposited material (22 to 24 feet). There may have been a hiatus in the actual occupation of the site between Subzone Ia and Zone II, while the material of Subzone Ib was being laid down. Artifacts were found in Subzone Ib, but they may be attributed to levels immediately above or below. The only fire pits found in Subzone Ib were in the lower half-foot of that subzone. The artifacts from the 23 to 24 foot zone may belong to the occupation represented by Subzone Ia, while those from the 22 to 23 foot level may belong to the occupation represented by artifacts from the lower part of Zone II.

The artifacts from Zone I are listed according to level in Table 1 and illustrated in Figure 1. The level between 21 and 22 feet does not fall entirely within Zone I. The demarcation between Zones I and II was noted at about 21.5 feet in the 1953 excavations and at 22 feet in the 1956 excavations. In Table 1 a column for 21 to 22 feet appears under Zone I and another under Zone II in order to permit proper placement of artifacts.

It will be noted that only one lanceolate projectile point was found in Zone I in the 22 to 23 foot level. This lanceolate point is very similar to the Dalton points of Missouri. It has a concave base with basal grinding and beveled edges. The other projectile points from this zone are side-notched and stemmed points of various forms. The two deepest projectile points found — in the 26 to 27 foot level — are side-notched points and, except for the material from which they were made, were very similar. They were found in areas 180 feet apart. A contracting-stemmed point from the 21 to 22 foot level is very similar to points found in the lowest level of the Hidden Valley Shelter in Missouri (Adams 1941). This point also has basal grinding. Several other projectile points and fragments of points were found in Zone I. In general points from Zone I are similar to ones found in sites of the Archaic stage in this area. The workmanship consists of coarse flaking with little retouching. The shapes are common Archaic forms.

Pieces of worked bone, such as awls and cut bird bones, were found throughout Zone I. An outstanding bone artifact is a finely made projectile point of deer antler from the 26 to 27 foot level. Other significant artifacts from Zone I are the flint choppers from this same lower level. The scrapers from Zone I are certainly unspectacular; most of them are crude flint flakes used with or without minor retouching. Two definitely shaped disc scrapers were found.

The artifacts from Zone I can be assigned to the Archaic on the basis of the following: (1) the projectile points are similar both in workmanship and form to those found in other Archaic sites; (2) no artifacts that can be considered diagnostic of paleo-Indian cultures have been found; (3) the artifacts and the food remains indicate a generalized subsistence pattern based on hunting and collecting. Radiocarbon assays indicate the time range for this zone (C-907, C-908, C-903, and C-904). Fowler, Winters, and Parmalee (1956: 32) date a zone lying between 20.5 and 22.3 feet, comprising the lowest part of Zone II and the very top of Subzone Ib, at 6219 B.C. ± 488 years; they date Subzone Ia, between 23.8 and 26.0 feet, at 7922

FIG. 1. All artifacts from Zone I of the Modoc Rock Shelter, shown by 1-foot levels (numbers at left). See Table 1 for detailed listing. Slightly more than ¼ actual size.

TABLE I

DISTRIBUTION OF ARTIFACTS ZONES I-IV

	ZONE I						ZONE II							ZONES III & IV									
	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
HAMMERSTONES		1		1						NOT	LIST	ED	FOR	ZONES	II,	III,	AND	IV					
CHOPPING TOOLS																							
CHOPPERS (FLINT)	1	1					1		1		2	5	1	1			3	4	8	5	2		
CELT (STONE)							1(d)				1(d)			1(d)									
GOUGE OR ADZ (FLINT)															1						1		
AXE FRAGMENTS (POLISHED STONE)														1	2			2	1		1		
FULL GROOVED								1															
3/4 GROOVED													1					1(aa)					
AXE BIT FRAGMENT (PECKED STONE)															1								
ADZ (POLISHED STONE)															1FR								
ADZ (ANTLER)																			1(d)				
MILLING AND ABRADING TOOLS																							
SANDSTONE ABRADER								1		1		1	1		1			1	1	2	1	1	
NUTTING STONE							2	1															
MILLING OR MORTAR										1													
GRINDING STONES									1														
PROJECTILE POINTS																							
STEMLESS					1BV														1BVBG				
EXPANDING STEM							3(i)	1	2	2(i)	1	7	7	11	5	6(v)	8	34(o)	27	24	3	1	
STRAIGHT STEM								1BG	1	2	1		7	1	2	1	3	11(o)	9(v)	1		3	
CONTRACTING STEM						1BG		1BG					1BG(g)		1						1		
SIDE-NOTCHED	1BG	1BG(b)				1BV(g)	1BV		1	6(m)	8	14(k)	6(k)	6(m)	12(r)	2	5(u)	35(y)	13	5	2	1		
BASE-NOTCHED																				1 (?)			
PENTAGONAL																			1BVBG				
LANCEOLATE					1BGSE	1 BG (gh)	1			1 BG			1BVBG										
LANCEOLATE, CONVEX BASE								1															
SINGLE SHOULDERED													1							1	1		
LOBED BASE					1																		
BLANK					1		4	1	1	3	2		2	1	1	1 FR	6	6	1		1	1	
FRAGMENTS		1 T			5		4 (j)	10(k)	12	20	20(o)	9(p)	23	11	29		31	38(p)	51	27	4	1	
ANTLER	1											1					1						
KNIVES																							
CRUDE														1					3				
KNIFE							FR	FR	1	2						FR	3	1	2	3FR		2	
SCRAPERS																							
UTILIZED FLAKE		1	1							NOT	LIST	ED	FOR	ZONES	II,	III,	AND	IV					
END							1	2	2		4			2			2	7		2			
SIDE				1					1										3				
FLAKE				1	2		4			2	2		2			1	1		1	1		1	
DISC OR THUMB			1		1					5	5		2	2	5	6	17	4	5				
TRIANGULAR							1																
HAFTED																							
CORNER-NOTCHED									1														
SIDE-NOTCHED									1	7	3					1	11	9		1			
STRAIGHT STEM												1					1	3					
EXPANDING STEM									1 BG	1		1	1				2	1	2	3			
PERFORATING TOOLS																							
DRILLS																							
CRUDE																	1						
T OR WINGED					1		1	1			1				1	2		1	1				
SIMPLE																		1					
STEMMED													1										

STEMMED														1										
STRAIGHT STEM																	3		1					
EXPANDING STEM																				2				
EXPANDING STEM OR SIDE NOTCH																1								
NOTCHED BASE											1	1				1	3							1
EXPANDED BASE																								
REWORKED POINTS									1 BG															
DALTON POINT											2		1											
SIDE-NOTCHED POINT										2T(n)	1	3	2		2T	1T	2		3T	2T				
FRAGMENTS						1																		
AWLS											1		3	2	1	4	1(bb)	2	1	1				
SPLIT BONE		1								1	1	1	1		1	1	1		1					
DEER ULNA																	4							
BIRD BONE									17(aa)								2T	2T 1(l)	1T 1(d)					
GARFISH JAWBONE																								
FRAGMENTS (BONE)		1T 2(d)	1 T		2 (d)	1(d)			9 (d)		1 T	1T 5(d)	3 T	3T 3(d)	2T 2(d)	3 T	1 T	1 (d)	1 (d)					
COPPER													1											
ORNAMENTS																								
ELK TOOTH BEAD											2 (?)								1					
CRINOID STEM BEADS																			1 (l)					
STONE BEAD					1																			
PEBBLE PENDANT									1		2			1					1 (l)					
PERFORATED MUSSELS																	1 (l)							
TORTOISE SHELL PENDANT					2		1	2							1									
ANCULOSA BEADS																			1 (lv)					
SHELL PENDANT									1 (l)			2			2 FR	1	1	2 FR1	1					
BONE PENDANT																			2(sc)	1 (s)				
DECORATED BONE PENDANT									1															
CLAY BEAD																								
SMALL FLINT TOOLS									3	3														
BANNERSTONES																								
WINGED										1 FR										1 UNF	1 FR			
PRISMOIDAL																		1 FR						
GENICULATE																								
MISCELLANEOUS																								
WORKED SHALE																			1					
PAINT CUP OR PALETTE																								
CUT BIRD BONE FRAGMENTS				1										1	1 (s)					1				
ANTLER TIPS											6		1	2	3	4	1		8	6				
TORTOISE SHELL DISH									2FR(d)		2FR(d)	1FR(d)	2FR	1	1FR(d)	1FR(d)								
BONE GRAVER				1														1 (d)						
FISH BONE NEEDLE																				1 (?)				
ANTLER HANDLE														2							1			1
POLISHED DISC																			1 FR					
BONE TUBE OR HANDLE																			1					
WORKED AND CUT	1 (a)		1 (e)	1 (f)							6		6			1 (t)	1 (x)	1 (z)	1(cc)	1		1		
BONE AND ANTLER																								

NOTES - BG - BASAL GRINDING
SE - SERRATE EDGE
BV - BEVELED EDGE
T - TIP
(a) - Parallel incised lines
(b) - Blunted tip
- Stem
* - Base

(?) - Probable identification
(c) - Grooved
(d) - Identification uncertain
(e) - Oval shape, use unknown
FR - FRAGMENT
UNF - UNFINISHED
(f) - Flat worked fragment
(g) - On Contact Zones I-II

(h) - Beneath Burial 27
(i) - 1 with BV, BG
(j) - 1 SE
(k) - 1 BG
(l) - Drilled
(m) - 4 BG
(n) - Also 1*
(o) - 1 BV

(p) - 1 BV, 1 SE
(q) - Hidden Valley 1
(r) - 3 BG
(s) - Decorated, notched
(t) - Antler, notched edges
(u) - 2 BG
(v) - Corner notched
(w) - From side-notched point

(x) - Bird effigy (?)
(y) - 7 BG
(z) - Blunt end
(aa) - With burial
(bb) - Possibly dog bone
(cc) - Incised

The side-notched projectile point listed in the 25- to 26-foot level is a hafted scraper which should be listed in the 26- to 27-foot level. The drill fragment listed in the 21- to 22-foot level belongs in the 22- to 23-foot level.

B.C. ± 392 years. Thus, the evidence at the present time indicates that Zone I was occupied between 8000 and 6000 B.C.

Zone II

Zone II includes all the artifacts from the 15-foot level to the top of Zone I. In the 1953 excavations, Zone II corresponded roughly to a brown deposit above which was one of a lighter color. The color differentiation was not found in the 1956 excavation and its absence may be due to the different contour of the bluff in that area. The pits opened in 1953 were close to a gully-like depression in the edge of the bluff. It is possible that this gully concentrated the runoff from the area immediately above it, so that more organic material was carried over the edge at this one spot. In consequence, this darker soil was deposited in the area immediately beneath the gully mouth and not on either side. In the vicinity of Modoc, the cap on the bluffs consists of a dark brown loess resting on lighter loess; the two zones of color occupy positions just the reverse of those found in the 1953 excavations. The darker loess may lie below the lighter loess in the site because processes of erosion and redeposition on the site have inverted the relative positions of the darker and lighter zones (Fowler, Winters, and Parmalee 1956: 10-11; Leighton, personal communication).

The lanceolate points which are scattered throughout this zone give clues to the development of the Archaic in the central Mississippi Valley. Most of them were found in the lower 2 feet of the zone but one was found as high as the 15 to 16 foot level (Fig. 2). Their form is variable, but most fall within the range of the Dalton-Meserve points from Missouri. None are fluted although most have basal grinding.

A fully grooved ax was found at a depth of 19 feet. By interpolation this depth indicates a date of about 5000 B.C. There can be no question that the people who inhabited Modoc when the ground surface was at the 19-foot level knew the technique of polishing stone. This is borne out not only by the finding of this ax but also by the finding in 1953 of a fragment of polished stone in the 20 to 21 foot level, and the fragment of a bannerstone from the 18 to 19 foot level. Choppers of chipped flint were found throughout Zone II. A milling stone was found at a depth of 19 feet. Other milling and nutting stones found at the site indicate that seed gathering played a part in the subsistence of these people.

Articles of personal adornment including shell beads and pendants of bone and shell were more frequently found in this zone than in Zone I, although the shell beads and stone pendant from the 22 to 23 foot level of Zone I belong in this category.

Faunal remains from this zone include deer, small mammals, fish, clams, snails, and birds. Various charred seeds and nuts have been found.

Side-notched projectile points predominate, although other forms, including various stemmed and notched forms, occur. The points from the lower half of Zone II exhibit beveled edges and basal grinding as common attributes but they are minimal in the upper half.

At the bottom of Zone II, on the contact between it and Subzone Ib, five fully flexed burials were found. These burials are the deepest found at Modoc and, on the basis of the correlation of the levels of the 1956 excavation with those of the 1953 excavations, should date at around 6200 B.C. These then constitute the earliest group of burials yet found on an Archaic site and should, therefore, contribute to the understanding of the racial history of the American Indian. No artifacts were found with these burials with the possible exception of the lanceolate point (Fig. 2 *e*) found immediately under Burial 27. It is not known if this point was associated with the burial, or if it was already in the debris on which the individual was buried. All of these burials, except one, were placed on the ground surface and covered.

One burial, found at a depth of 20 feet, was partially disarticulated. Associated with it was a large cache of bird bones which consisted primarily of more than 80 radii of geese (*Branta canadensis* and *Chen spp.*) and five whole and a few fragmentary tarsometatarsals of Sandhill Crane (*Grus canadensis*). Some of these had been made into awls. This burial offering, dating from around 5000 B.C., is unusual for such an early time.

On the basis of the artifacts, I place the occupation of Zone II in the Archaic stage. It differs from Zone I in the greater variety of artifacts and in the presence of lanceolate points. Personal adornment seems enriched and the technique of polishing stone is added. I feel that Zone II reflects the continuation of a trend which is evident in Zone I. The duration of

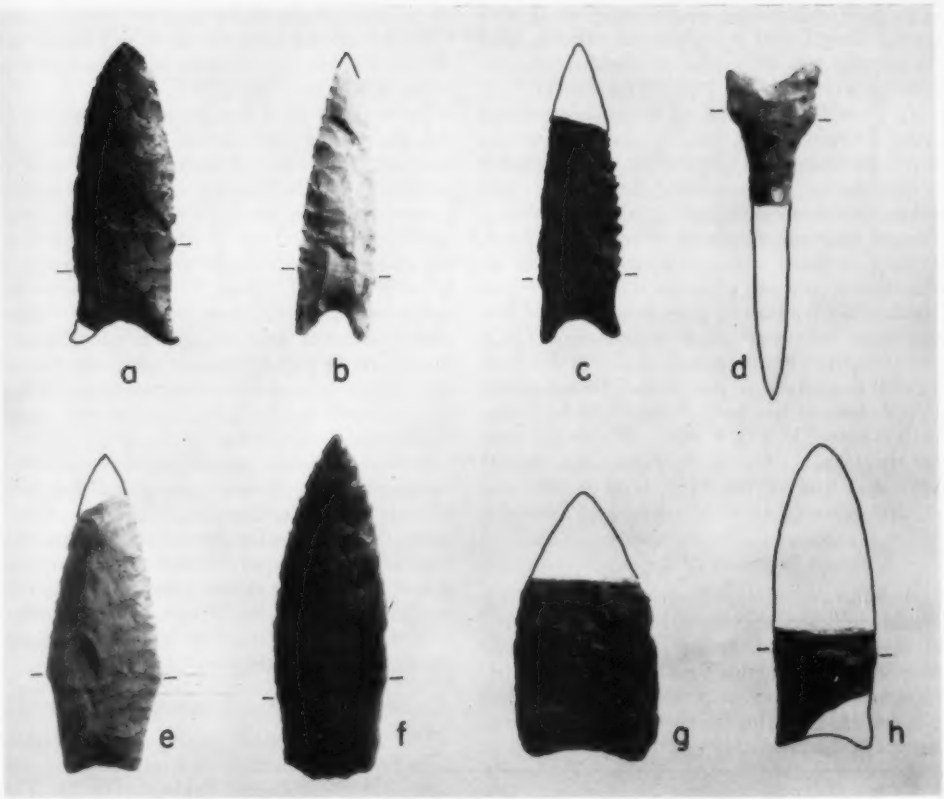

FIG. 2. Lanceolate points and fragment of a drill from the Modoc Rock Shelter. Short lines at the sides of the points indicate the extent of basal grinding which is slight on *a*, *f*, *g*, pronounced on the rest. *a*, from the 20-to-21 foot level; *b*, from the 15-to-16 foot level; *c*, from the 22-to-23 foot level; *d*, fragment of a Dalton point reworked into a drill, from the 19-to-20 foot level; *e*, from the 21-to-22 foot level; *f*, from the 20-to-21 foot level; *g*, from the 16-to-17 foot level; *h*, from the 18-to-19 foot level. Length of *f* is 8.47 cm. (3 5/16 inches).

Zone II has been assessed by radiocarbon assay (C-899, C-900, C-903, C-904). The date for the 20.5 to 22.3 foot level is 6219 B.C. ± 488 years and that for the 15.3 to 16.0 foot level 3657 B.C. ± 164 years (Fowler, Winters, and Parmalee 1956: 31).

Zones III and IV

The artifacts from Zones III and IV are listed in Table 1. In general, they repeat and elaborate trends already noted. The trend from side-notched to broad-bladed, expanding-stemmed points continues until the latter forms predominate in Zone IV. Most forms of artifacts noted in Zone II continue along with new ones. Disc or thumbnail scrapers are common, but hafted scrapers are more frequent.

Perhaps one of the most significant differences between Zones I and II and the upper zones at Modoc is the fact that evidence of simple structures is found in the top of Zone III and in Zone IV. A half dozen small posts, set in a row on the north and west side of the fireplaces, were apparently interlaced with twigs or saplings to form windbreaks. Several fragments of what appears to be mud daubing have been found and it is possible that these windbreaks were coated with mud to make them more windproof.

Several burials, both flexed or semiflexed, were found in Zones III and IV. It appeared that most of them had been placed on the

surface of the ground and then covered with earth. Burial gifts accompanied two: a large ¾-grooved ax with one, a single-shouldered projectile point in one hand of the other.

In Zone IV fragments of three bannerstones were found: a red-banded slate prismoidal form, an unfinished prismoidal, and a possible geniculate or single-pronged form. The only other bannerstone found at the site was a winged fragment from the 18 to 19 foot level. Present evidence indicates a rather intense occupation of the site at about the 10 to 11 foot level. This is also the portion of the site that we have excavated most intensively. There seems to have been a concentration of fire beds as well as artifacts in this zone. The age of the upper deposits has been determined by radiocarbon assay (M-483, M-484). We set the date for the 10 to 11 foot level at 3325 B.C. ± 300 years and that for the 8-foot level at 2665 B.C. ± 300 years (Fowler, Winters, and Parmalee 1956: 31).

Summary of Zones

A summary of data from the Modoc Rock Shelter indicates that the site was first occupied at about 8000 B.C. by people of an Archaic stage of development. The assemblage of artifacts assignable to that period is relatively simple, consisting of side-notched projectile points, choppers, hammerstones, scrapers, bone awls, and other worked bone. A relatively sterile band of windblown material may indicate a gap in the occupation of the site. The few artifacts found in this band may have been derived either from the zones above or below. At approximately 6200 B.C., the site was reoccupied by people with an Archaic culture, and this occupation continued until about 2000 B.C. During the earlier part of this Archaic reoccupation, side-notched projectile points were most common, although other forms were also known. Lanceolate projectile points similar to the Dalton-Meserve points of Missouri are a part of this assemblage. Disc or thumbnail scrapers are very common, but end and side scrapers and hafted scrapers are also known. Winged, stemmed, and simple drills, and bone awls of various forms comprise the perforating tools. Articles for personal adornment consist of pebble pendants, beads made of snail shells, and pendants of bone and mussel shell. At the 19-foot level, assigned a date of about 5000 B.C., the technique of polishing stone makes its appearance. A grooved ax, cylindrical fragments of polished stone, and a fragment of a bannerstone are known from this level. Tightly flexed surface burials are found in levels assignable to about 6000 B.C.

Later portions of the Archaic occupation of the shelter are characterized by the disappearance of lanceolate points and the increase in numbers of broad-bladed, expanding-stemmed forms until they become predominant. Other artifacts remained much the same, continuing the pattern of elaboration and greater variety of forms begun in the lower levels. Burials are not tightly flexed, and three instances of burials with associated artifacts are noted. Bannerstones, or weights for atlatls are more numerous. There is evidence of increased or intensified occupation of the site, and of the use of windbreaks around fires.

Present evidence indicates that subsistence remained relatively unchanged, and that such animals as deer, raccoon, and opossum, as well as many of the smaller mammals, fish, mussels, and birds were eaten throughout the occupation of the shelter. A few grinding and nutting stones, the lowest at 19 feet dating to about 5000 B.C., occur in small quantities throughout the upper zones of the site.

Chronological and Cultural Placement

The recent accumulation of radiocarbon dates for a large number of Archaic sites makes possible a chronological analysis (Fig. 3). The sites seem to fall into three major groupings. Two sites, Zone I of Modoc and Level 6 of Graham Cave, have strata extending back to a period between 6000 and 8000 B.C. [This was written before Miller 1957 was published—Editor.] Russell Cave, the Eva complex, Level 4 of Graham Cave, and Zone II of Modoc all date from a time between 4000 and 6000 B.C. Several sites dating from later than 2000 B.C. comprise later Archaic components in Tennessee, New England, and Ontario.

Selected traits from sites in the central Mississippi Valley drainage area have been compared for each of these 2000-year intervals, 2000-4000 B.C., 4000-6000 B.C., and 6000-8000 B.C. Data for the most recent period are taken from the Carlson Annis site (Webb 1950b) and Indian Knoll (Webb 1946: 235-40) in Kentucky; the Kay's Landing phase in Tennessee; Zone IV at Modoc (Fowler, Winters, and Parmalee 1956: 12, 20); and from the upper portions of Graham Cave (Logan 1952). The

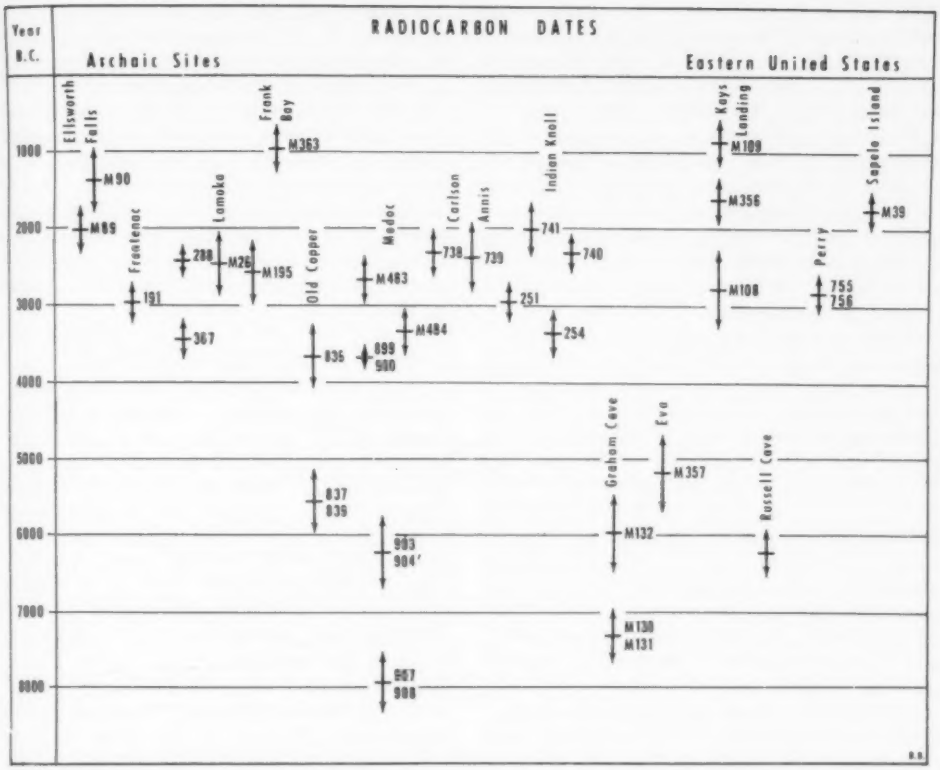

FIG. 3. Graphic representation of radiocarbon dates for sites of the Archaic stage in the eastern United States. Arrows represent the range within which it is probable (68%) that the actual date fell. All samples except those with an M-prefix were run by the University of Chicago laboratory whose prefix (C-) has been omitted for simplicity. The vertically-placed names above each column of dates refer to the site or other cultural designation for the group of dates.

data for the second period came from the lower half of Zone II at Modoc, Levels 4 and 5 of Graham Cave, and the Eva phase in Tennessee. It is possible that the Faulkner phase of southern Illinois may belong in this period (Fowler 1957), but as yet this is conjectural. The data for the earliest period are derived from Zone I at Modoc, and Levels 5 and 6 of Graham Cave.

This comparison points up some of the trends of development within the Archaic stage of the central Mississippi Valley region. General subsistence seems to be fundamentally the same in all periods, but the dog may have been added as food in the period between 3000 and 2000 B.C. In the late period, the settlement pattern seems greatly elaborated, but this may be due to scantiness of data regarding early sites. The manufacturing processes seem constant; grinding and polishing are confined to bone and bases of projectile points in the early period. Various sorts of implements for processing food are found in all three periods, indicating the possibility that the basic subsistence pattern characteristic of the Archaic stage was well established in the early period. One could discuss each group of selected traits separately but space prohibits this. In general the evidence seems to indicate that the basic pattern was established early and elaborated as time went on. For example, the elaboration of pounding and chopping tools from chipped stone choppers and adzes to polished stone axes, adzes, and celts is interesting.

We can at present postulate this early estab-

lishment and elaboration of the Archaic stage for the central Mississippi drainage. Whether this holds for other areas is open to question. It is possible that it could not be documented for areas such as New England, New York, and the Great Lakes states in general due to the presence of glaciers, glacial lakes, and severe climate in those areas at that early time. A similar developmental sequence in the Archaic stage of the Ozark region seems to be justified by the accumulating data (Baerreis 1951) but must await confirmation from radiocarbon assay or stronger horizon ties.

Some sites are from a period after 2000 B.C., thus indicating that the Archaic stage lasted later in some areas than it did in others. It has been pointed out that peoples in an Archaic stage of culture were found in some areas at the time of white contact. Lewis and Kneberg (1947) had previously suggested the possibility of cultures of the Archaic lasting well beyond the beginning of the pottery-bearing cultures in western Tennessee. Most of the sites mentioned as dating after 2000 B.C. are in somewhat marginal areas. It is possible that environmental factors might have precluded any rapid assimilation of agricultural practices by more marginal groups.

The actual terminal dates of the Archaic stage in any given area have not as yet been determined with any degree of certainty. Ritchie (1955) has suggested the possible association of pottery with an extensive burial cult in New York as early as 2450 B.C. A recent radiocarbon date on a fiber-tempered pottery zone in Georgia puts the end of the Archaic at around 1700 B.C. (M-39). I have suggested in a recent paper (Fowler 1957) that the pottery-bearing Black Sand component (F°77, Cole and Deuel 1937) may date as early as 2500 B.C. This was suggested on strictly typological grounds and must await further confirmation. The radiocarbon placement of the Hopewell and Adena cultures suggests that they were established shortly after 1000 B.C. Additional information bearing upon this point is the dating of early maize agriculture in the Southwest and northeastern Mexico about 2000 B.C. (Dick 1954: 143). Possibly, then, by between 2000 and 1000 B.C., in the central United States — roughly the upper Mississippi and the Ohio river drainages — cultures well advanced over the Archaic stage were in "full swing." Ritchie (1955) has presented a cogent analysis of one phase in this later stage and has made pertinent suggestions as to its development and origin. In the southeast, fiber-tempered pottery was making its appearance at this same time.

In this treatment of the Archaic stage I have not meant to imply that all of the cultural units dated and discussed are identical. That there are various traditions of the Archaic stage has been suggested by others (for example, Mayer-Oakes 1951). I have pointed out elsewhere (Fowler 1957) that there are apparently several local projectile point traditions within the Archaic.

Comparisons with the Great Plains

In the Great Plains area a Folsom site near Lubbock, Texas, has been assigned a radiocarbon age of 7934 B.C. ± 300 years (C-558). The Folsom artifacts have been associated with extinct bison and thought to represent a big game hunting culture. Artifacts which indicate that seed gathering played any large part in the subsistence have not as yet been found. The temporal position of post-Folsom big game hunting cultures from the Great Plains area has been established by stratigraphic and radiocarbon analysis. For example, the age of the Horner site in Wyoming, where projectile points of the "Scottsbluff-Eden" types were found, was determined to be 5867 B.C. ± 500 years (C-795). The Long site in South Dakota (Hughes 1949: 270-1) has been assigned a date of 5675 B.C. ± 740 years (C-554; see M-50 for earlier dating of the Long site). Deeply buried sites in Nebraska producing lanceolate projectile points (Holder and Wike 1949) have yielded dates ranging from 8539 B.C. ± 1500 years to 3306 B.C. ± 350 years (C-470, C-471, C-824). Although these last sites indicate a somewhat more generalized subsistence than the other sites mentioned, most yielded assemblages indicating that big game hunting was the major mode of subsistence, but lacked implements for seed processing.

Recently a radiocarbon date has been released indicating that the age of the Lewisville site, near Denton, Texas may be greater than 37,000 years (O-235, O-248; Anonymous 1956). [This was written before publication of Crook and Harris 1958. — Editor.] A Clovis point is said to have come from this site although such an age for Clovis raises some very serious problems concerning cultural development and stability (Krieger 1957). Clovis is known to have been stratigraphically earlier than Folsom (Sel-

lards 1952) and people of this group apparently specialized in hunting elephants. Points of the Clovis type are found throughout the United States, although it cannot necessarily follow that the same subsistence pattern was followed wherever Clovis points are found. Outside of the possible association at Denton, Texas, there is no evidence at present that seed collecting was a very important part of Clovis subsistence.

There are sites from the Great Plains, however, that seem to be of an Archaic character as we have defined it, such as McKean and related sites which date from around 1500 B.C. (Mulloy 1954a: 433-4; C-795, M-368, M-369). In interpreting the data from the northern plains, Mulloy (1954a: 433) states:

> Prior to 6000 years ago, in an Early Prehistoric period, the area seems to have been occupied by small groups of buffalo-hunting nomads, among whom the Folsom complex and the various complexes called Yuma were important. Indications are strong that the people of this period were specialists in hunting varieties of buffalo that are now extinct. Following this there is a time span of uncertain length for which evidence is lacking. This may indicate abandonment or partial abandonment of the area or simply that remains of occupants have not yet been discovered. Dating from some time before 3500 years ago evidence appears of peoples strongly oriented in their economy toward plant gathering and small animal hunting with little or no emphasis on buffalo.

In addition, people who specialized in hunting the mammoth — makers of Clovis points — were present in an earlier period (Sellards 1952). The interpretation of the preagriculture prehistory of the Great Plains, then, is that big game hunters inhabited the area up to at least 4000 B.C. and that there is possibly a time period when the Great Plains were uninhabited, followed by a period when the plains were occupied by a culture primarily Archaic in nature.

Comparisons with the Great Basin and the Southwest

In the western United States, especially in the Great Basin area, a cultural unit similar to the Archaic, the Desert culture, has been suggested (Jennings and Norbeck 1955; Jennings and others 1956). This extends back to around 8000 B.C., according to radiocarbon dates from Danger Cave of 7839 B.C. ± 630 and 7010 B.C. ± 340 (C-611, C-640) confirmed by dates on other samples at 8320 B.C. ± 650 (M-202, M-204). The Cochise culture in the Southwest, whose Sulphur Spring stage dates from 5806 B.C. ± 370 (C-216) to 4260 B.C. ± 450 (C-511) and whose Chiricahua stage dates from 2056 B.C. ± 270 (C-515), has been identified as a regional variant of the Desert culture.

Taylor (1956) has recently reported briefly on Frightful Cave in Coahuila, Mexico. His general conclusion seems to be that the remains which he found represent an extension of the Desert culture and, in general terms, that the culture there seems to parallel in stability that at Danger Cave. The Coahuila materials date back to a period of about 6000 to 7000 B.C. Taylor (1956: 230-1) concludes:

> This . . . suggests that neither the Desert-type "gathering cultures" nor the High Plains-type "hunting" cultures actually represent the earliest culture-type in western North America. Both may be specializations which arose from one or more preceding cultures which had different subsistence emphasis in response to strictly local conditions at, or soon after, the end of Pleistocene climatological conditions.

There is apparently little evidence of an Early Hunter stage in the Great Basin area and recently several archaeologists have rejected the older view that the Desert culture developed out of a big game hunting stage. If such a developmental sequence did take place, it must have been "before human occupation of the Southwest [or] before human entry into the New World. Such sites as Tule Springs, Nevada (23,500 years old by radiocarbon) may throw light on this question" (Jennings and others 1956: 72). In summary, in the Great Basin and in the Southwest the Desert cultures, which date back at least to 10,000 years ago, were strongly oriented toward seed gathering and small animal hunting. There is no evidence that they developed from an earlier big game hunting culture, but Early Hunter sites are known from the Southwest (for example, Haury 1953, Sellards 1955).

Glacial and Climatological Data

Bearing upon the data we are discussing is the time of the last major glacial advance, or Valders (Wright and Rubin 1956, Leighton 1957), and the subsequent changing climatic conditions down to the present time. A well-known glacial event in late Wisconsin times is the so-called Two Creeks interval. Material obtained from trees knocked over by the advance of the glacier placed this event at 9454 B.C. ± 350 years (C-308, C-365, C-536, C-537) and 9416 B.C. ± 100 years (W-42, W-83, Suess

1954: 472; see also M-342, M-343). From this it has been estimated that this glacial advance reached its maximum at around 9000 B.C. (Flint and Deevey 1951: 263; see also C-630). With the recession of this glaciation there followed a period of warming climate and a gradual change of the plant cover to the climax vegetation. At one period the climate was hotter and drier than at the present. It was previously suggested that this Altithermal (also called Thermal Maximum or Xerothermic) period dated from 3000 to 4000 B.C. (Antevs 1950), but more recently it has been suggested that it took place 4000 years ago or around 2000 B.C. (M-291; Zumberge and Potzger 1955: 310-1; Heusser 1955).

A comparison with the Archaic dates reveals that the time of recession of the last glaciation just precedes the earliest dates now available for the gathering cultures of the Archaic. The time period suggested for the Altithermal corresponds rather closely with the terminal dates suggested for the Early Hunting cultures.

Summary

In the tentative interpretation of data thus far presented, several things of importance stand out. First of all, the radiocarbon dates on various Archaic sites indicate that the Archaic in the eastern United States extends back to a time earlier than the Altithermal. On the basis of the dates from Zone II at the Modoc Rock Shelter, the Eva complex in Tennessee, Russell Cave in Alabama, and Level 4 at Graham Cave in Missouri, it is safe to say that several Archaic traditions extend back to at least 6000 B.C. On the basis of the lowest zone of the Modoc Rock Shelter and of Level 6 at Graham Cave, I propose to extend the Archaic in those sites back to 8000 B.C.

Milling stones in the lowest levels of Graham Cave indicate the possibility that seed collecting as an important form of subsistence extends back to this early time. The case for the hypothetical early dating of the Archaic which I have suggested above is strengthened by dates from other North American sites where assemblages indicate a subsistence pattern of the same general kind as that of the Archaic. This places these gathering and collecting cultures in the same general period as the Early Hunter and tends to remove the former concept of a neat succession of cultures throughout the United States which proposed that the Early Hunters were succeeded by collecting and gathering cultures. To the contrary, on the basis of radiocarbon chronology, Early Hunters were at least contemporaneous with occupants of portions of the United States whose livelihood was based on general collecting. It has already been pointed out that the Desert cultures apparently did not have an Early Hunter predecessor in the Great Basin.

This is not to say that there was not an Early Hunter occupation of eastern United States. Fluted points are found throughout the eastern United States as surface finds. For example, in the vicinity of the Modoc Rock Shelter itself, fluted and lanceolate points of almost every previously known form have been found (Smail 1951). Several actual sites also attest to an Early Hunter occupation. Specimens from one of these, the Shoop site in eastern Pennsylvania, are believed by Witthoft (1952) to resemble most closely the Clovis material from the Great Plains. The Williamson site, in Dinwiddie County, Virginia (McCary 1951), is considered by Witthoft to be closely related to Shoop. The Bull Brook site, in Massachusetts, seems to produce the same general type of material (Byers 1954). Ritchie (1953) has reported the Reagan site as a probable paleo-Indian site in Vermont. It seems, however, to differ from the three just mentioned, and possibly belongs in a somewhat later period (Ritchie 1953: 256). Several artifacts from the Parrish site in Kentucky are attributed to an Early Hunter occupation (Webb 1951: 434-8). Again, these artifacts seem to be fairly closely related to specimens from the Shoop and Williamson sites, but there was no stratigraphy to make possible the isolation in time of the Early Hunter and Archaic material at the Parrish site. Several sites have recently been reported from the southern Tennessee and Alabama area where fluted and lanceolate points of almost every previously recognized form have been found (Soday 1953, Mahan 1954, Kline 1953). Rarely in the eastern United States at the present time, however, has a site been found where Early Hunter artifacts have been proven to be stratigraphically earlier than Archaic materials. A possible exception to this is Graham Cave where lanceolate points predominate in the lowest zone but are mixed with Archaic materials. [At Bull Brook, Archaic materials occur in sandy loam, always above the paleo-Indian. No mixing is reported. — Editor.]

However, since much of the Early Hunter material east of the great Plains seems attributable to the general Clovis-like horizon, it is probable that this represents a pre-Archaic occupation of the eastern United States. We can propose at the present time then that if there were Early Hunter occupations later than Clovis they are very likely contemporaneous with early Archaic occupations in certain areas. The Starved Rock Archaic (Mayer-Oakes 1951), Graham Cave levels 5 and 6, and the Reagan site may represent contact and mixing of Early Hunter and Archaic cultures.

The Great Plains area is about the only place where the idea of cultural succession from Early Hunter to cultures of the Archaic stage actually holds true. The reconstructed sequence indicates that the early occupants of the plains area were specialists in big game hunting, that during the Altithermal the plains area was abandoned, and that following this, peoples with a subsistence pattern based on collection rather than big game hunting moved into the area. Lewis (1953) suggests that the Early Hunters were prairie (and plains) dwellers, that the eastern Archaic were forest dwellers, and that they were probably contemporaries, especially during the Altithermal when the prairies extended much farther east than at present. A similar interpretation has been employed by

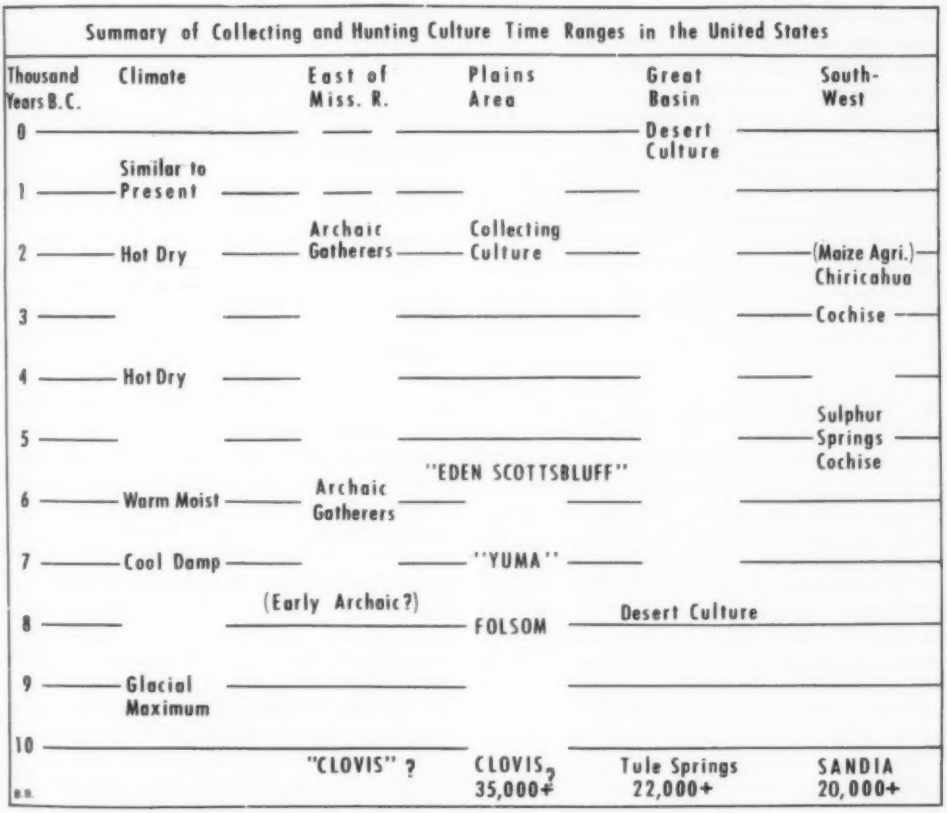

FIG. 4. Chart showing the proposed temporal relationships of hunting and collecting cultures in the United States. The names in capital letters represent Early Hunter components; those in quotation marks indicate that types of projectile points constitute the main body of available data. The column on climate is based primarily on the following sources: Deevey 1939, 1943, 1951; Flint and Deevey 1951; Fuller 1935; Heusser 1955; Hough 1953, 1956; P. B. Sears 1942, 1948, 1951; Zumberge and Potzger 1955. Gaps are left in the column Archaic Gatherers to indicate the persistence of the Archaic stage in marginal areas.

others who have seen materials from different sites as a blending of traits from the two traditions (Mayer-Oakes 1951, 1954; Logan 1952).

Interesting evidence along this line is the fact that Baerreis (1951) found projectile points typologically of the Early Hunter tradition only in his second period in the Archaic sites of northeast Oklahoma. Zone I of Modoc Rock Shelter, where to date primarily side-notched and contracting-stemmed projectile points have been found, is dated around 7900 B.C., whereas Level 6 of Graham Cave, where lanceolate points predominate, is later or around 7300 B.C. The lanceolate points at Modoc occur primarily in Zone II or 6200 B.C. and after.

The picture obtained from this brief analysis of radiocarbon dates on the Archaic stage is presented in Figure 4. In general this confirms the conclusion reached by Roberts (1951: 22) that the radiocarbon dates "demonstrate the occupation of the New World about 10,000 years ago. . . . [and] show that several culture patterns were already established at that time." Among these patterns can be mentioned the Desert culture, the Early Hunters, and the general Archaic Gatherers (term borrowed from J. Charles Kelley). All of these except the Early Hunters were similar in subsistence pattern. Thus, the Archaic stage in the eastern United States was but one of several adaptations which the early inhabitants of the New World made to the differing ecological settings of the Postglacial period. Whether this Archaic development is the outgrowth of the Early Hunters who entered the New World in glacial times or the result of a later thrust of boreal cultures from the Old World has yet to be determined (Spaulding 1946).

Acknowledgments. Any merit this paper may have results from fruitful discussions with many people, among whom are: Thorne Deuel, J. Charles Kelley, M. M. Leighton (who is preparing a report on the geological aspects of the site), Paul W. Parmalee (who identified the faunal remains), and Howard Winters. I also wish to acknowledge the fine work of Bettye Broyles (who made the drawings and charts) and of Charles Hodge (who did the photographic work). I want to thank Douglas S. Byers for his helpful suggestions.

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THE ARCHAIC AS SEEN FROM THE OZARK REGION

DAVID A. BAERREIS

WHILE THE discussion and identification of complexes as "Archaic" is at present a common feature in a substantial number of archaeological reports, the actual excavation of Archaic sites has not kept abreast of the recognition of the importance of this stage in the culture sequences of North America. Much of its current importance as a widespread cultural manifestation is based upon the typological identification of surface materials through which period placement is inferred on the basis of resemblance to forms of known archaeological provenience or on the putative absence of traits of late origin such as ceramics. Such a procedure is not without its pitfalls. It is a difficult matter to establish whether or not a surface collection constitutes a true assemblage in the sense that these artifacts have a context consisting of remains left by a single people during a restricted period of time. Further, since a very substantial number of types of artifacts used during the Archaic period persist until later times, it is also very difficult to establish the temporal position of a complex or even whether or not a particular body of materials might represent the attenuated artifact complex of a more advanced culture left at a temporary hunting camp. It is therefore of importance at this time to evaluate what is now actually established concerning Archaic complexes.

The Ozark region provides an appropriate point of departure. It is an area for which we have relatively early reports of complexes which might be assigned to an Archaic *stage* — one represented by cultures with a hunting and gathering economy and lacking horticulture (Ford and Willey 1941: 332-4). M. R. Harrington (1920: 103-10) reported at his Site 1 near Hot Springs on the bank of the Ouachita River, Arkansas, a midden deposit exceeding 9 feet in thickness where pottery and the small projectile points of the Caddoan complexes were confined to the very top of the deposit. Because of

the large dart points and other implements, the deeply buried complex would today be classified as Archaic. With the identification of the Ozark Bluff-Dweller culture, also quite early in time, the Ozark region revealed how a relatively simple complex from a technological point of view might still represent a people practicing horticulture (Harrington 1924). The interesting assemblage of perishable artifacts accompanying the remains of such domesticated plants as maize, squash, beans, gourds and sunflower, has perhaps obscured the fact that under less favorable conditions of preservation it would be extremely difficult to distinguish such a complex from one of Archaic type. Yet the very diversity of the agricultural complex can perhaps be used to argue the relative lateness of the Ozark Bluff-Dweller culture. Portions of the Ozark region may well have comprised a marginal area in which cultures of an early stage persisted, gradually accepting some traits from more advanced cultures occupying surrounding areas. The region also therefore provides opportunities for the consideration of the problem of the extent to which an early *stage* might persist into a later *period*. The concept of period is here regarded as a time unit during which, in a given culture region, certain traits regarded as horizon markers make their appearance even though they may not be accepted by all cultural groups resident in the area. The appearance of ceramics in an area is frequently taken as a terminal horizon marker for the Archaic period although the evidence of the Ozark Bluff-Dweller culture does indicate that a horticultural complex may antedate the appearance of ceramics. Despite this, the absence of ceramics and other traits characteristic of later periods may still be the best criterion for the identification of an Archaic period.

With the establishment of the temporal limits within which the archaeological complexes are to be considered, it is essential also to consider the conceptual tools to be used in the analysis within that framework. The term "archaic" may also be used in reference to a cultural *tradition*, a particular configuration of culture traits which of course may persist, as was indicated above, through a number of culture periods (Phillips and Willey 1953: 626-8). In order to move toward historical reality it is essential to discover how many recognizable cultural traditions may be isolated in the Archaic period. The culture history of the Archaic period is in part bound up with the spread of these distinct traditions, perhaps largely through the migration of peoples. In addition, other processes such as the diffusion of specific elements from these traditions may result in developmental sub-stages within the Archaic, or create the impression of the existence of such sub-stages. In brief, culture history is a complicated phenomenon in which we must explore, through the formulation of testable hypotheses, the mechanisms by which regional culture sequences came into being. It is in this framework that we shall attempt to evaluate what is known of the Archaic complexes as seen from the Ozark region. It is assumed that the Ozark region was inhabited during the Archaic period by people of several cultural traditions that probably interacted with each other and that the initial problem is to separate and define these traditions.

THE ARCHAIC TRADITIONS

While the Ozark Bluff-Dweller culture has been cited as one of the striking complexes of the region, it is impossible to take descriptions by Harrington (1924), formulated essentially upon perishable materials, as comprising one of the basic Archaic traditions. Many of the perishable items, such as coiled basketry, may well be late traits introduced at the same time as the domesticated plants. On the other hand, the analysis of a series of nonceramic sites in northeastern Oklahoma revealed the presence of a long developmental sequence which has been designated the Grove focus (Baerreis 1951), initially defined as comprising three sequent phases (A through C). The last of these would persist beyond an Archaic stage because of the suggested correlation with the arrival of horticulture. The following summary is therefore based solely on traits attributed to phases A and B. The projectile point complex of the Grove focus is varied in typology. Large stemmed points are the most abundant forms but the total complex includes side- and corner-notched forms, contracting stem points, a flaring stem type, points with a broad, parallel-sided, and slightly expanding stem and a form having an expanding stem and lobed base. Possible horizon markers in this complex may be suggested as being found in the presence of projectile point blades having coarse serrations and also a distinct, sharply beveled blade.

Other forms of chipped stone implements are abundant and include bunts, drills, knives, scrapers, and choppers. Small abraders, grinding stones, and mortars are also present. The single polished stone implement was a full-grooved ax. Artifacts of bone and shell were notably scarce and appeared initially only in Phase B as a shell scraper, bone awls, and an ulna flaking tool. In the initial description of the Grove focus, Phase B also contained two points of lanceolate form originally compared with the Plainview type; the subsequent publication of the Graham Cave site in Missouri (Logan 1952) suggests an alternative source for the form.

Further confirmation of the reality of the sequence in the Grove focus has been provided by the analysis of the preceramic levels of two deep bluff shelter deposits of the Smith site, DlSmI and DlSmII (Wittry 1952). The same three time phases appear to be present, at least in one shelter, DlSmI. Confining our attention again to the two earlier phases, we find that only a few traits can be added to the earlier trait inventory. Additions to the complex of bone implements, all in Phase B, consist of a fragmentary bird bone with a drilled hole suggesting its use as a whistle and the preparation of turtle carapaces to form small bowls. In shell, "hoes" appear to make their initial appearance in Phase B also, although they are more abundant in Phase C. A series of burials found in the shelters provides some information on funeral practices. Burials attributed to the Grove focus are partially or fully flexed primary inhumations placed either on the side or back. A scarcity of grave goods is characteristic of the complex but some use of shell beads, beds of red ocher, and grinding and abrading stones was noted (Baerreis, Wittry, and Hall 1956).

The analysis of a bluff shelter in Cherokee County (Ck-44), Oklahoma, extended the distribution of the Grove focus southward, but the mixed nature of the deposits precluded specific assignment of traits to the preceramic period (Hall 1954). Despite this, the site provides further evidence of a negative character in that the bone, shell, and polished stone industries of this complex are not greatly elaborated and consist of a very limited series of artifact types.

The same tradition also makes its appearance in southwestern Missouri, its content being specifically elaborated by recent work in the Table Rock Reservoir area (Chapman, Maxwell, and Kozlovich 1951; Chapman 1956; Bray 1956). The descriptions of Robert T. Bray dealing with the material recovered from the Rice site (23SN200) are most helpful in documenting the presence of essentially the same tradition in this area.

The limits of distribution of this complex have not been determined, but the sites mentioned appear adequate to establish the presence in the Ozark region of an Archaic tradition possessing a diverse series of projectile point types and in general characterized by an extensive chipped stone industry. Since grinding stones were also used, it appears likely that seed gathering supplemented hunting. There is but a weak development in bone, shell, and polished stone industries. In both the analysis of Baerreis (1951) and Wittry (1952), lanceolate points suggesting influence from a derivative paleo-Indian tradition were found only in Phase B, rather than in the earliest occupational zone, though admittedly these are few in number and thus weaken the case. Bray (1956: 57) similarly found some lanceolate points at the Rice site. Although they are regarded as typologically the oldest in the site, they occurred, physically, in intermediate levels. A very plausible explanation, involving aboriginal cleaning out of a portion of the shelter, is advanced to account for their position but as in the case of the Oklahoma sites, a late interaction with a paleo-Indian tradition must be regarded as a possibility.

If one attempts to evaluate the cultural origins of this tradition, he should not expect that an identical complex will be found widely distributed in space. Diffusion of trait complexes permits alteration of the complex in the course of its movement; actual migration of people carrying the complex would facilitate acculturation by providing contacts with other peoples. A search for origins may therefore involve the investigation of significant portions of the cultural assemblage as it crystallized in the Ozark region.

A key unit is the Trinity aspect recently established in the Upper Trinity River region of northeast Texas (Crook and Harris 1952; Crook 1952). The Trinity aspect consists of two sequent foci, an older Carrollton focus and a later Elam focus. The Carrollton focus is at present known solely from lithic materials. Projectile points are the most important of the artifact types; large scrapers ("gouges") are next in abundance, but the complex also in-

cludes knives, drills, choppers, gravers, net sinkers, and rarely, grinding stones. Of the projectile points, a stemmed variety with parallel sides and a square base seems characteristic, but flaring and contracting stem points as well as a form with a deep pair of basal notches are present. About 5% of the projectile points represent a lanceolate form of Plainview or other "early" types. The later Elam focus is marked by a decline in the size of the projectile point — a feature noted also in the Grove focus — and by the disappearance of the lanceolate point, graver, and net sinker.

The Carrollton focus, as currently known, may well reflect contact with a paleo-Indian tradition — as suggested above for the Grove focus — but its importance in the present discussion lies in its representation of a component element in the Archaic tradition we have discussed. The authors call attention to the resemblance of some of the point types to "those of the Borax Lake–Pinto Basin–Silver Lake–Lake Mojave desert cultures of California" (Crook and Harris 1952: 37). Geographically closer comparison might have been made with the Ventana Cave materials (Haury 1950). One stream of cultural influence coming into the Ozark region as the Grove focus may well be represented in a regional form by this assemblage found in the Southwest and Texas.

An earlier analysis of the Grove focus (Baerreis 1951) stressed relations with Southeastern Archaic sites as opposed to ties between Ozark Bluff-Dweller culture and that of the southwestern Basketmakers. The present suggestion of affiliation with western complexes of an earlier time horizon does not vitiate the concept of ties with southeastern Archaic materials but does propose that the ties represent a spread of such a culture stage through the Ozark region, or some adjacent area, into the southeast.

Up to this point, attention has been directed to sites of a generally southern location with no consideration of a possible derivation of these complexes from the north where even an ultimate Asiatic origin must be kept in mind. While a far western migration route might be a possibility, either east or west of the Rocky Mountain chain, it is unlikely that this could be proved or disproved on the basis of present evidence. Sites in the Plains area where Archaic components are noted, such as the lowest level in Ash Hollow Cave (Champe 1946), or Signal Butte II (Strong 1935) with which tentative correlations are made by Champe, may perhaps derive their present complexion from the lack of more extensive excavations. They do, however, suggest a gradual attenuation of Archaic influences spreading westward into the Plains and perhaps preserving some elements of an earlier paleo-Indian tradition. There thus remains the evidence from more northerly sections of the Mississippi Valley where traces of vigorous and extensive Archaic remains are now coming to light. It would be tempting to use the long Archaic sequence in the Modoc Rock Shelter in Illinois (Fowler, Winters, and Parmalee 1956) as a potential source for the basic Archaic tradition discussed above. However, the diverse materials already produced by the limited excavations in the deeper levels of the site suggest a more complex assemblage than that with which we have dealt. The tradition seen from the Grove focus as a point of departure, may have crystallized in this form from more elemental complexes.

To consider briefly other possible Archaic traditions in the Ozark region, the most distinctive which may be noted is the Fourche Maline focus in Oklahoma (Bell and Baerreis 1951: 19-27; Newkumet 1940). A large number of distinctive Archaic artifacts make their appearance with this complex: round graves, dog burials, bone pins, antler drifts, bone atlatl hooks, chipped stone double-bitted axes, boatstones, pendants, expanded center gorgets, reel-shaped gorgets and a diverse series of beads. The lateness of much of this material is indicated by the association of pottery types, yet as Bell has indicated (1953), preceramic components are present at some sites. Here we have a clear intrusion of an Archaic complex that might well be responsible for the dissemination of many of the elaborated Archaic traits. Since this same configuration of traits is present in the southeast as part of a long preceramic tradition and established as early by numerous radiocarbon dates, it may reasonably be interpreted as a westward spread of one of the eastern Archaic traditions.

A more difficult problem of interpretation is posed by Graham Cave in Montgomery County, Missouri (Logan 1952). The stratified remains at this site should be a major means of unraveling some of the region's tangled skeins of history. A distinctive feature of the site is the presence of a series of lanceolate projectile points which occur in two major varieties. One is characterized by short channel flakes on one or both faces, by pronounced grinding on the

sides which produces a slight expansion at the base, and by a markedly concave base which is actually recurved in contour and produces slightly flaring "ears." The other variety has a flat base and appears to be proportionately shorter and broader. While both varieties are more abundant in the lowest level (6), they persist in later levels. Logan (1952: 67-8) interprets this material as a fusion of cultural traditions, stating:

> The Archaic horizon of Central Missouri is not the product of one stream of cultural influence. Traits from several different sources have fused to produce the Archaic culture seen in Graham Cave. The Archaic horizon in level 6 is a series of Eastern Archaic elements injected into a previously existing complex which has the appearance of having had a western origin. This original complex included the concave based points with flutes and basal grinding reminiscent of the Clovis Fluted points. Since a Pleistocene or near Pleistocene antiquity for this level seems improbable, there must have been an antecedent to Graham Cave elsewhere in the region.

Logan points out that "the Archaic complex of Graham Cave especially from levels 4 and 5 on is essentially a complex with an eastern orientation" (p. 68) and that "from level 5 up, Graham Cave is comparable to the southeastern material" (p. 69). It seems clear from the context of these remarks that Logan concludes that a paleo-Indian horizon is basic in this region and that an Archaic complex from the east interacted with and finally completely absorbed this paleo-Indian tradition. Obviously an alternative hypothesis is that a paleo-Indian tradition was involved in a pattern of acculturation with an already resident Archaic tradition, the origin and nature of this Archaic tradition being one of the problems under consideration in this paper.

The fundamental question is whether we are dealing with the same Archaic tradition as that of the Grove focus. One essential difficulty in resolving this question is that we do not know the full extent of the borrowing from the paleo-Indian tradition. How many traits in addition to the lanceolate points are part of that complex? Obviously the question can only be answered by comparative studies and preferably by the discovery of "pure" sites of this complex. Nevertheless, when the traits are examined it is obvious that a substantial number of elements is not found in the Grove focus. Considering only the two lowest levels at Graham Cave, these traits would include: chipped stone adzes, serrated flakes, cupstones, roller pestle, bone needles, bone tubes, polished antler awls, antler drifts, perforated wolf canine, secondary burials, shell pendant. The proportion and range of projectile point varieties also show some differences. There is clearly present a substantial series of traits that do not appear to be part of the Grove focus as now known, yet the residual traits have much in common with this tradition. It may well be, as Logan suggests, that eastern influences are here leading to an elaboration of this simple Archaic tradition. In terms of temporal relationships, despite the fluted points in the Graham Cave assemblage, this horizon may be no later than the earliest materials of the Grove focus.

Some Theoretical Considerations

Up to this point, the discussion has revolved around a brief summary description of a few key sites which serve to indicate that a number of distinct traditions may be recognized, even within a limited geographic zone in the distribution of the Archaic. These would appear to be in part the result of the convergence of influences from both easterly and westerly directions although they may also have spread into the region from the north. This is, after all, the ultimate source of New World culture if we are dealing with the early and basic horizons. As in other regions, an increase in polished stone forms as well as elaborated bone implement types, appears to characterize the later time levels — here perhaps specifically seen as a result of eastern influence. Yet we are not dealing solely with a differentiation of temporal horizons; there are different cultural traditions within the Archaic which have a parallel development in time.

While we may manipulate these historic traditions, at the same time the Archaic cultures present an interesting problem in their basic configuration of traits. Paleo-Indian complexes of the west present a surprising uniformity in such aspects as forms of projectile points. A single type of projectile point, or a very small number of types, dominates a manifestation at a single component. At the Archaic components, on the other hand, diversity in forms of projectile points is commonly found and the same situation is to be seen in other aspects of the material culture. This situation, in itself, deserves careful analysis if the problems of the Archaic are to be resolved.

No single answer can be given if a question is raised as to why these differences appear. A

simple solution might be to say that we are dealing with a later time period when a higher level of cultural growth and complexity had been attained. Yet radiocarbon dates are pushing the limits of Archaic cultures farther back in time so that at present we are beginning to see a clear temporal overlap in the two broad culture types. Differences in environmental factors may also be posed and certainly they do have their influence on the total configuration. Yet it would be pushing an already weak explanation to the point of absurdity to postulate, for example, that the greater diversity of game in the eastern United States could be responsible for a more heterogeneous assemblage of projectile point types and to extend this reasoning to other aspects of the culture. The problem would appear to revolve largely around differential situations that facilitated acculturation in one region in contrast to the other.

In both the paleo-Indian and the Archaic culture types we are probably dealing with small social units organized as bands. The analysis of the general cultural stage of the Early Archaic as presented by Griffin (1952a: 354-5) appears to be a reasonable one. We can follow this analysis and suggest that the initial peopling of much of North America was accomplished through the spread of small bands, perhaps numbering between 20 and 30 people who ranged over and exploited a fairly specific hunting and gathering territory. Presumably the population, initially at least, would be rather widely dispersed and contacts between the groups would not be extensive. We might anticipate that the earliest artifact assemblages when isolated and defined for this region of primarily Archiac traditions will be characterized by a rather limited tool complex and by standardization and uniformity in such specific items as projectile point types. Perhaps the earliest level at the Hidden Valley Rock Shelter in Jefferson County, Missouri (Adams 1941: 188-96), represents this situation. Obviously when sex and age groupings are considered, in such a social unit only a very small number of male adults are manufacturing the projectile points. Furthermore, if the group is patrilocal, male manufacturing techniques would tend to be perpetuated within the group since only the women would be directly involved in bringing in new innovations from outside the social group. Diffusion of new styles or local innovations could take place, of course, but these would be extremely slow because the low density of population would also tend to limit extensive contact between groups. This then might serve to explain the uniformity in points seen in paleo-Indian components.

Griffin (1952a: 354) has suggested that the Archaic peoples had such patrilocal bands but this point might be questioned, or at least we may suggest that a shift in residence pattern took place. Seed gathering appears to be an early and basic trait among the Archaic peoples. For the Ozark region, seeds found in later components in the bluff shelters suggest extensive experimentation with wild plants as a source of food and this may also serve to indicate extended reliance upon this environmental resource. Such an emphasis might well be associated with a matrilocal rather than a patrilocal society. If we can not stretch the meager evidence this far, we can at least suggest that bi-locality is present. In either situation, the marriage pattern would bring in new males to the local group and with them new styles of projectile points and other cultural devices associated with hunting and fishing activities which had become standardized in their band. This is presumably a situation which should foster rapid cultural change in equipment associated with male economic activities. In the Archaic cultures of the greater Ozark region, it is precisely in the material culture associated with male economic activities that the greatest diversity is to be seen.

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THE DESERT CULTURES AND THE BALCONES PHASE: ARCHAIC MANIFESTATIONS IN THE SOUTHWEST AND TEXAS

J. Charles Kelley

THE CONCEPT of a continent-wide Archaic cultural horizon in North America has been developing for over a decade. Recently, this concept has received considerable reinforcement in publications and in discussions at conferences. It now appears to have fairly general acceptance among American archaeologists who have concerned themselves with the problem. Basic to this concept is the identification of the southwestern Desert cultures as the cultural and temporal equivalent of the eastern Archaic, and the recognition of the Balcones phase of Texas as a cultural keystone uniting these western and eastern cultures into one continuous culture area on the same temporal level, forming the Archaic horizon in American prehistory. In this paper the data regarding these putative Archaic cultures in Texas and the Southwest are summarized and their relationships with the eastern Archaic are critically examined.

The Desert Cultures

The Desert cultures represent a block of archaeological sites and local cultural sequences widely distributed in the southwestern United States and having a considerable time depth there. Many of the component cultures and the general cultural patterns are relatively well known and the stratigraphic position of the block is established by both archaeological and geological evidence. In addition, radiocarbon dates are available for a number of the Desert culture units apparently representing the full temporal range of the occupation.

The term "Desert cultures" has been used by several writers. I first used it as early as 1947 (Kelley 1947a: 99, note 14) and there certainly must have been earlier usages. Jennings and Norbeck (1955) used the term as an integral part of their discussion but in a somewhat broader sense than is intended here. However, the term "Desert cultures" was first well defined and the cultural pattern described by the Southwest seminar in 1955 (Jennings and others 1956: 69-72). The data summarized here derive in large part from the deliberations and the published record of that seminar.

Principal cultural units or sequences included within the Desert cultures are components from Pinto Basin, Danger Cave, Ventana Cave, Bat Cave, Burnet Cave, Tularosa Cave (nonceramic levels only), and the sequences reported from the Cochise area of southern Arizona, the Grants area of New Mexico, and the Big Bend area of western Texas. Many other Southwestern and Great Basin cultural components, such as Leonard Rock Shelter, Fort Rock Cave, Black Rock Cave, probably should be included in the pattern as well as somewhat similar manifestations from a larger distributional area. The known geographic distribution of the Desert cultures includes California, Nevada, Utah, Arizona, New Mexico, southwestern Texas, and northern Mexico, and almost certainly covers a broader area extending from the eastern foothills of the Rocky Mountains to the Pacific Coast and from Oregon to central Mexico, if not beyond. Temporally, the Desert cultures were best developed in the period from about 6000 B.C. to shortly before the beginning of the Christian era (Jennings and others 1956). Radiocarbon dates would seem to indicate that the initial stages of the pattern were in existence by about 8000 B.C. Locally the occupation is terminated by the addition of pottery at about 300-200 B.C. In southwest Texas, northern Mexico, the Great Basin, and California, modified versions of the Desert cultures seem to have survived locally into historic times.

The Desert cultures are characterized culturally by their means of livelihood, the general nature of their material culture as well as by certain specific artifact types and technologies, and probably by their socio-political pattern as well, to the extent that it can be inferred from the archaeological record. The Desert culture peoples were foragers, utilizing nearly all the natural plant and animal food resources of their habitat, and combining the technologies of hunter, gatherer, catcher, and on occasion, even fisherman. Their principal hunting specialization was probably small game rather than large, wherein they differed from the paleo-Indians with their apparent primary specialization on big game animals, and wild plant foods seem to have been quite important in their diet.

Grinding tools — seed slabs or oval basin milling stones together with handstones or

manos — and heavy, crude, chipped stone artifacts such as choppers, "pulping planes," combine with projectile points — usually dart or spear points — and such hunter's aids as scrapers, drills, knives, and rubbing stones to form the basic nonperishable artifact trait list. There is some evidence for a technological concentration on the use of cores rather than flakes, and certainly on percussion flaking rather than pressure flaking in the flaked stone industry.

In those sites where more perishable materials have been preserved, there are innumerable artifacts of fiber, wood, hide, bone, horn, and some shell. Baskets — especially coiled woven — matting, nets, sandals, fire drills and hearths, digging sticks, fire tongs, dart shafts, curved clubs, gourd vessels, and bone awls are especially well represented. The dominant weapon was the spearthrower and dart rather than the bow and arrow.

Rock shelters and cave mouths as well as many sites in the open were used for habitations. There is some evidence for the use of crude earth lodges, perhaps only in the later phases. The dead were buried in simple graves or under stone cairns, usually in flexed position with some mortuary offerings.

We may infer from the archaeological record and from our knowledge of people observed living under similar environmental and cultural conditions that the socio-political organization of the Desert culture people was simple (Kelley 1952; Hodge 1907: 59-88; Davenport 1924: 291, footnote 6, which contains a translation of the ethnographic summary in Alonso de Leon's "Historia de Nuevo Leon"). Almost certainly the population was made up of small bands who were seasonally migratory. Quite probably these bands were exogamous patrilineal lineages. They may have gathered in season at localities of rich food resources to carry out a simple regime of economic, social, and ceremonial activities; trade and barter, marriage, puberty ceremonials, initiation rites, curing ceremonies, dances, fighting, and sport-rites of passage and of intensification. Consult Steward (1938, 1940) for details of the social life of peoples considered to be ethnographic counterparts of the Desert cultures.

Maize-bean-squash agriculture and pottery were added to the cultural pattern toward the beginning of the Christian era, perhaps as early as 2000 B.C. for agriculture (Dick 1954) and 300 B.C. for pottery (Martin and others 1952; Wheat 1955: 174), although some writers favor a date of about A.D. 1 for the appearance of pottery (Martin and others 1952: 504). These introductions probably reached the Southwest by diffusion from the Formative or Preclassic horizon in Mesoamerica (Jennings and others 1956: 79-82). It seems clear that the later agricultural and ceramic cultures of the Southwest slowly developed from the Desert culture base under the stimulus of these Mesoamerican innovations. Although these developments terminated the Desert cultural pattern in the central area, it seems to have survived quite late in peripheral and refuge zones.

Stratigraphic Position of the Desert Cultures

Certainly the Desert cultures as a group are older than the agricultural and ceramic cultures of the Southwest. Thus, in Ventana Cave an occupation level of the Hohokam culture rests on a thick midden accumulation of Desert culture origin (Haury 1950). Somewhat similar stratigraphic evidence is available from Tularosa Cave (Martin and others 1952), the Cochise sites (Sayles 1945; Sayles and Antevs 1941), and the Big Bend sites (Kelley, Campbell, and Lehmer 1940). There is, moreover, considerable continuity of culture, plus additions and elaborations, from the Chiricahua and San Pedro stages of the Cochise culture into both the Mogollon and Hohokam cultures (Sayles 1945; Martin and others 1952; Wheat 1955; Haury 1943, 1950). The San Juan Basketmaker culture from which the Anasazi (Pueblo) cultural pattern developed appears to have been a Desert culture base to which agriculture was added (Jennings and others 1956). The origin of the San Juan Basketmaker in a Desert culture of Cochise type was discussed some years ago by Donald J. Lehmer in an unpublished paper.

The stratigraphic position of the Desert cultures with relation to paleo-Indian industries, such as Sandia, Clovis, Folsom, Plainview, Eden, Scottsbluff, is not quite as well established. There is some stratigraphic evidence, however, which conforms largely with evidence from other sources. In Ventana Cave the Desert culture levels were superimposed upon beds of geologic origin containing artifacts of the Ventana complex which Haury (1950) believes to be related to the Folsom complex and hence paleo-Indian. In Burnet Cave, in the Guadalupe Mountains of southeastern New Mexico, a variant Folsom (possibly Clovis) Fluted point was found associated with extinct fauna and in

debris underlying a Desert culture level (Howard 1932; 1935: 62-79).

Geologic stratigraphy — the so-called "Southwestern alluvial chronology"—provides the best evidence for the placement of the Desert cultures stratigraphically. In many localities from northern Mexico to Wyoming and from southern Arizona to western Texas, geologists have identified a series of relatively recent alluvial beds separated by erosional disconformities. (The list of references is long. See especially Bryan 1941; Hack 1942; Leopold and Miller 1954.) Varying formation names are used locally but the terminology employed in their correlation identifies the oldest alluvial bed as the Number I formation, the second as the Number II formation, and the most recent as the Number III formation.

The Number I formation is usually made up of yellow to red clays, silts, sands, and locally, gravels which are well compacted and usually cemented with caliche. This formation represents an extensive valley fill, and usually contains remains of extinct fauna. It is usually referred to a terminal Pleistocene dating, perhaps the Valders advance, but it may be of multiple age and origin. Later, the Number I formation was heavily eroded and extensive caliche deposits developed on the resulting disconformity and in the underlying beds. This period of intensive erosion and inferred aridity is usually attributed to the Altithermal period (Leopold and Miller 1954: 53-5, Table 7).

The Number II formation represents a well developed valley fill in the channels eroded in the Number I formation during the preceding "dry" period, often covering the adjacent uneroded sections of the Number I formation as well. The sediments range from gravel through sands to silts, and usually contain dark humic bands. These deposits are poorly consolidated and often they are divided into a lower and an upper part, separated locally by a minor erosional disconformity; these beds are known as the II *a* (lower) and II *b* (upper) formations. Occasionally, laminated pond or marsh deposits lie at the base of the sequence. Only modern faunal remains have been found in the Number II formation, which is usually referred to the Medithermal period.

The Number II formation was eroded during a subsequent period of stream degradation. Steep-sided erosional channels were cut into the underlying deposits. This erosional stage has usually been attributed to the "Great Drought" of the Southwest datable to the late 13th century, but there is growing evidence, largely unpublished, that it should be attributed instead to an earlier period of erosion. The argument is too involved to summarize here. One phase of the problem is discussed by Kelley, Campbell, and Lehmer (1940: 160-1). The Number III formation consists largely of loose gravels, sands, and silts filling the steep-sided channels of the preceeding erosional epoch and extending out over the valley flats to form a thin stratum overlying the Number II formation. This formation is usually attributed to the period of about A.D. 1300 to 1800, and some investigators think that its deposition was terminated by modern erosion attributable to overgrazing by domesticated animals. Others attribute termination of the Number III deposition to climatic causes. Only modern fauna occurs in the Number III formation.

In many localities of the Big Bend region of Texas, sites of the Desert cultures occur in situ in the alluvial deposits (Albritton and Bryan 1939; Kelley, Campbell, and Lehmer 1940). Desert culture remains are notably missing there from the Number I formation — as are all traces of human occupation — and appear for the first time in the Number I-Number II erosional disconformity, hence presumably in Altithermal times. Desert culture components are numerous in both the II *a* and II *b* fills and occur also on the II-III disconformity. Sites of cultures assignable to the ceramic and agricultural horizon occur consistently only in the Number III formation, and must be more recent than remains attributable to Desert cultures.

This association between Desert culture sites and the formations recognized in the Southwestern alluvial chronology is verified by finds in many localities. Best evidence for this correlation is found in southern Arizona in the Cochise sequence (Sayles and Antevs 1941). Here the Chiricahua stage of the Cochise culture, one of the best known of the Desert cultures, occupies alluvial deposits attributable to the Number II *a* formation, and probably is attributable also to the preceding erosional epoch. Sites of the subsequent San Pedro stage of the Cochise, out of which later ceramic cultures putatively develop, occur in alluvial beds identifiable with the Number II *b* formation, and in the disconformably overlying silts, pottery has been found.

In the Cochise area, however, there are Desert culture remains in still older beds. In gravel and sand beds, with associated pond deposits, underlying strata assignable to the II *a* formation occur artifacts identifiable as the Sulphur Spring stage of the Cochise. These are apparently associated with extinct faunal remains and the deposits in which they occur are said to represent the Number I formation, and, probably, debris accumulated in erosional channels of Altithermal age as well. Only in this locality have Desert culture remains appeared in association with a Number I formation exposure, and here there may well be some doubt as to either the association or the assigned age of the geologic beds in which the specimens occur. The beds in which the older (Sulphur Spring stage) Cochise specimens occur may eventually prove to be arroyo bottom deposits of Altithermal times rather than true Number I formation deposits.

Faunal Association and Other Evidence

In general the faunal association of the Desert cultures in both rock shelters and alluvial sites is modern, with extinct fauna occurring only in underlying beds. However, in two instances there seems to be some evidence of association of extinct fauna with Desert culture remains. As noted above, Sulphur Spring Cochise artifacts occur in gravel deposits with remains of extinct fauna, including horse, mammoth, dire wolf, and pronghorn antelope (Sayles and Antevs 1941). However, both artifacts and fossils were washed into position, although apparently from no great distance, casting some doubt on the reality of the association.

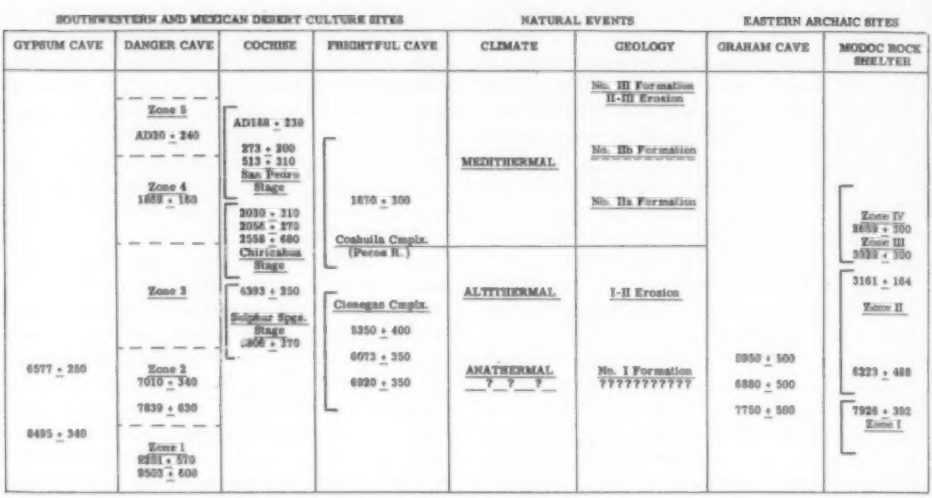
In Gypsum Cave, Nevada, several cases of putative association of Desert culture artifacts with extinct ground sloth remains have been recorded (Harrington 1933). Bones of two types of camel and horse also are included among the extinct faunal remains found in the cave but their association with the cultural remains is not demonstrated. The Gypsum Cave type of projectile point is one variation of a widespread dart point pattern which appears, in some localities at least, to represent an early phase of the Desert cultures, offering some reinforcement to the reputed association. (I do not mean by this that Manzano, Langtry, and other similar points are typologically Gypsum points; I do mean that these points, which are basically dart points with relatively small contracting stems, represent a common pattern of projectile point manufacture as compared with other patterns such as Pinto or Folsom Fluted points.)

Usually, the plant remains found in Desert culture sites are types found in the same region today. There are exceptions, however, notably the occurrence of charcoal of hickory, found today only in moister climates, in the Sulphur Spring Cochise deposits (putatively the Number I formation).

In general the stratigraphic position of the Desert cultures may be summarized as follows. They seem to be generally later than the paleo-Indian cultures but may overlap them in time. The evidence indicates that they may have first appeared in the Southwest either in the Altithermal period, or alternatively, if the Gypsum Cave and Sulphur Spring Cochise associations prove valid, in the preceding Anathermal period, perhaps toward its close. Indisputable Desert culture artifacts have not been found anywhere in clear association with authentic "kill" or occupation sites of paleo-Indian cultures. Desert culture occupation of the Southwest seems to have been widespread during the Altithermal and Medithermal periods. About the beginning of the Christian era, the Desert cultures appear to have been transformed locally into the early Southwestern agricultural and ceramic cultures, although there may have been local survivals for some centuries thereafter.

Radiocarbon dates are available from a number of Desert culture units representing a full time range. The more important dates are summarized in Figure 1, which also shows the radiocarbon dates for certain eastern Archaic sites. It is worth noting that the range of dates for rock shelter components of the eastern Archaic is comparable to the range of dates for rock shelter components of the Desert cultures. The total range of dates for the Desert cultures is from about 8495 B.C. to A.D. 188, with the open site dates concentrated in the upper or most recent ⅔ of this distribution and those from rock shelters consistently extending farther back in time. The earlier dates from Zone I of Danger Cave were not used in calculating this range because the details of the cultural associations are not provided in the preliminary report (Jennings 1953). [This was written before Jennings 1957 was published. — EDITOR.]

Another approach to the radiocarbon dating of the Desert culture occupance is to check the dates derived elsewhere for the sequence of



These dates are derived from Johnson 1951; Jennings 1953; Fowler, Winters, and Parmalee 1956; and Crane 1956. All dates are B. C. unless otherwise noted.

FIG. 1. Summary of certain radiocarbon dates from the Desert cultures and the eastern Archaic.

climatic events with which the Southwestern alluvial chronology has been associated against the position of the occupance in the alluvial sequence. Thus, Quimby (1954) by combining radiocarbon dates with reasoning based on geological interpretations has dated the Anathermal period at about 7000 to 4500 B.C. and the Altithermal period at about 4500 to 2000 B.C., and believes that the subsequent Medithermal period began before 1000 B.C. Antevs (1955: 328-30) has rejected the radiocarbon dates for these events but arrives at somewhat similar dates through other means. His estimated date for the Altithermal is 5500 to 2000 B.C.; for the Medithermal his dates appear to be about 2000 B.C. to the present.

Thus, in general, stratigraphic and geo-climatic dates for the Desert culture occupance appear to be in fair agreement with the radiocarbon datings. There are, however, certain inconsistencies, and it seems probable that very early dates of rock shelter components, especially where there is no association with exinct fauna, should be treated with some caution until further verification is obtained. In general, however, the temporal position of the Desert cultures seems demonstrated by a variety of approaches.

THE BALCONES PHASE

In that area of the state of Texas lying south of the Caprock of the High Plains and bounded roughly by the Brazos River on the east and northeast, the Rio Grande on the west and southwest, and the Gulf of Mexico on the south, occur numerous archaeological sites representing a culture closely related to the eastern Archaic and the southwestern Desert cultures. This Texas Archaic horizon I have termed the Balcones phase (Kelley 1947a: 99). Suhm, Krieger, and Jelks (1954) have substituted Texas Archaic for Balcones phase, but I consider their term to be much too broad for the materials in question.

Sites of the Balcones phase are open camps, burned rock middens, and rock shelters. Some of these are surface sites representing either relatively recent occupation or locations which have not been disturbed by geological processes while others lie buried at various depths in the alluvial valley fills and in the fill terraces of the Texas rivers.

The artifacts found in these sites are largely chipped and pecked stone specimens, although the rock shelters in the west contain much perishable material, and bone and shell artifacts are to be found on occasion in open sites everywhere. There is an abundance of large

dart or spear points in a variety of forms, manufactured for the most part by percussion chipping with comparatively little retouch. Other chipped stone implements include core tools such as crude choppers, "palaeolithic" style handaxes, large scrapers, the so-called gouges and "war club spikes," blades or knives in a variety of shapes and workmanship, "spoke shaves," drills and miscellaneous rejects, cores, and similar indeterminate items of chipped stone.

Pecked stone implements include small one-hand grinding mullers, or manos, with plain or pitted faces; seed slabs, or metates, with shallow oval bowl or plain grinding surfaces; shallow circular mortars; small paint mortars; and sharpening stones, smoothing stones, and hammerstones. Rare items of polished stone are restricted largely to gorgets and pendants. There are side-notched pebbles and — locally and late — small polished pebbles with end notches and longitudinal grooves. Boatstones also occur but appear to be very late in the sequence.

There are also problematical stone artifacts such as limestone cobbles with groups of carefully made parallel incised lines and occasionally a polished groove (Kelley 1948). Polished stone axes, celts, adzes, gouges, and similar items are completely lacking, and arrowpoints and pottery do not appear until the very end of the Archaic sequence. This last complex of traits represents new ethnic groups and cultures known archaeologically in central Texas as the Toyah and Austin foci of the Central Texas aspect and farther north as the Henrietta focus (Kelley 1947a, 1947b; Krieger 1946: 87-159, 165-8; Suhm, Krieger, and Jelks 1954). Locally the old Archaic culture survived, modified only slightly by the addition of the new introductions and apparently not affected by ethnic displacement.

Artifacts of shell are rare, including pendants made from mussel shells, and pierced mussel shells with ground edges. In the west, some specimens of engraved shell occur and there are shell rattles and similar items. Bone artifacts are rarely found in the central and southern parts of the area but are quite common in the caves of the west where they include several types of bone awls, "needles," spatulate implements, atlatl hooks, beads, and pendants. Antler knife "handles," flaking tools, and punches occur in both the central and western sections and are presumably present in the south as well.

Perishable artifacts found in the western rock shelters include many types of basketry, matting, netting, fur and feather cloth, cordage, sandals; wooden atlatls and darts, curved clubs, fire hearths and drills; and other items. Food remains include animal bones in great variety and quantity — but representing only Recent species — mussel shells, snail shells, and occasional Gulf shells. Remnants of mussel shell baking ovens have been found in the central region. In the rock shelters of the west and along the rivers great quantities of plant food remains, and fish scales and bones occur. Evidences of agriculture are known only from the very latest Archaic in the west.

No house remains have been found in any of the Archaic levels or regions, although in the central section long-used fire hearths — pits lined with stones — are surrounded by circular cleared areas which suggest the presence of a perishable house structure. In the west, and rarely in the central section, pictographs and petroglyphs representing man and animals are found in some numbers. In the lower Pecos River region a highly specialized hunting cult apparently is represented in the stylized pictographs found in the rock shelters there. The principal method of disposing of the dead was by flexed or semiflexed inhumation in rock-protected graves, although cremation is known in rare instances from the west.

Regional Cultural Divisions and Chronology

Central Texas

There are three principal regional and cultural divisions within the Texas Archaic culture known as the Balcones phase. The central Texas area includes principally the portions of central Texas lying north and west of the Balcones fault which passes through or near the cities of San Antonio, Austin, and Waco. It extends some distance to the south of the fault line along the major rivers and westward as far as the Devil's River, thus including most of the Edwards Plateau. The Archaic cultures appear to thin out to the northwest and cannot be traced, as yet, beyond the caprock of the High Plains. Hughes (1955) and Tennell (Tennell and Hughes 1955) have recently reported Archaic kill and occupation sites in the Texas Panhandle. They describe and illustrate materials which appear to be Archaic in affiliation.

However, since they use the Suhm, Krieger, and Jelks (1954) typology, I am unable to place precisely their finds in my own Texas sequence.

Three foci have been recognized and there are indications that others may be identifiable. These are the contemporaneous Round Rock (south) and Clear Fork (north) foci which extend from very early to very late times but are replaced locally on the west by the late Uvalde focus. These three known foci are grouped somewhat arbitrarily into the Edwards Plateau aspect (Kelley 1947a; Suhm, Krieger, and Jelks 1954: 102-7). In north central Texas there is some evidence for the existence of a formative phase of the Clear Fork focus which has been called the Abilene culture. I doubt that such a culture or stage exists (Kelley 1947a).

Sites include many burned rock middens found around springs or eroding from the surfaces of the river terraces. Under analysis these middens are found to be made up of innumerable intersecting fire pits or hearths and firecracked stones which are discarded linings of these pits. Each midden represents a repeatedly occupied site, often including remains of several local groups with a few special artifact types diagnostic of each. In the alluvial terrace deposits beneath the middens, sites representing shorter periods of occupation of a similar type occur at various levels (Kelley and Campbell 1942). In general, sites occur in all except the lower ⅓ of the alluvial deposits of the 40-foot terrace of the Colorado River and throughout all except the upper few inches of the overlap, or veneer, of the 20-foot terrace on the 40-foot terrace.

Analysis of the archaeological remains found at various levels within the 40-foot terrace and extending into the 20-foot terrace show remarkably little cultural change in the contemporaneous Round Rock and Clear Fork foci from very early times to a comparatively recent date. The principal changes that do occur appear to be some variation in types and frequencies of specific projectile point styles and other artifact types and the late appearance of a few items of polished stone.

Dating the central Texas Archaic is difficult and estimates of its age range all the way from a remote period within the Pleistocene to late Pleistocene, early Recent and late prehistoric times. In at least one locality, the Kincaid Shelter (Suhm, Krieger, and Jelks 1954: 101-2) there is evidence that Archaic remains directly overlie beds in which occur paleo-Indian artifacts. In other localities there is good evidence for the occurrence of Archaic artifacts in geological beds which locally overlie beds which in turn contain paleo-Indian artifacts. However, there is some claim to an overlap of the early Archaic — the Abilene culture — with late paleo-Indian in an erosional period which may represent the Altithermal period (Kelley 1947a: 106-7).

There is some reason for correlating the 40-foot terrace of the Colorado River with the Elm Creek silts of the Abilene region in north central Texas and in turn with the Number II formation of the Southwestern alluvial chronology, which should place the 40-foot terrace approximately between 2500 B.C. to some time in the first millenium of the Christian era (Kelley 1947a). On a somewhat different basis for correlation, Antevs dates the 40-foot terrace at about 5000 to 1000 B.C. (Antevs 1950). By contrast, the comparable second Postglacial terrace of the Rio Grande appears to date around 2700 B.C.

The Archaic survived very late in central and southern Texas, appearing throughout most of the deposition of the overlying 20-foot terrace, and was finally replaced in the central area, at least, by pottery-using cultures that probably did not appear much earlier than A.D. 1200. On the Coastal Plain the Archaic pattern of living was still in existence with only slight changes when the first Spaniards entered the area in the early 1500's (Cabeza de Vaca, in Hodge 1907: 59-88; Alonso de Leon, in Davenport 1924: 291). Thus an unusually long duration and late survival for the Archaic in central and southern Texas are indicated.

South Texas and the Gulf Coastal Plain

South Texas includes the lower courses of the great Texas rivers and the Texas Coastal Plain. The region actually extends from the lower Brazos River, or some distance to the east of it, to beyond the Rio Grande in Tamaulipas, Nuevo Leon, and Coahuila, Mexico, on the southwest.

The Archaic cultures of south Texas are not well known and classification is difficult. In the southeast the Morhiss focus probably belongs with the Edwards Plateau aspect. Along the coast itself the Rockport focus is late prehistoric and historic Karankawa and is a greatly modified late Archaic culture which probably should not be classed within the Archaic at all. Near the mouth of the Rio Grande the Brownsville

focus is likewise a late culture of non-Archaic character, while the older Aransas focus of the Gulf Coast is probably a locally specialized Archaic culture (Campbell 1947, 1952).

It should be noted that the Texas Coast itself has been altered considerably in recent geological times and for the most part contains quite recent remains. However, occasional terrace remnants on the lower courses of the rivers show a sequence of archaeological materials and geological deposits very much like those of central Texas and with intrusive specimens from the central Texas region equating the two sequences. Here again, in the Berclair Terrace, Archaic levels overlie levels containing paleo-Indian artifacts and extinct fauna, and again there is some slight evidence for an overlap of the earlier Archaic levels and paleo-Indian horizon (Sellards 1940). I consider the Berclair Terrace of the Mission River to be the equivalent of the 40-foot terrace of the Colorado River. Pleistocene fauna and paleo-Indian points — plus one Archaic point — occur in the basal gravel; hearths and artifacts of Balcones phase affiliation occur in the overlying silts. The basal gravels probably represent redeposition during the Altithermal, a situation quite similar to that of the Sulphur Spring Cochise.

Southwestward in the semidesert section of the Texas Coastal Plain — usually known as the brush country — I frequently found Archaic sites in the course of my survey work. Although most of these sites were occupied for only brief periods, some of this material apparently occurs in superposition in buried sites extending the occupation backward in time. There is remarkable similarity and simplicity in artifact complexes from site to site and two or more general cultural periods are evident. These are the supposedly early Repelo focus and the later Absalo focus of MacNeish (1947) which I (Kelley 1947a) group in my Monte aspect (the "Coahuiltecan phase" of Sayles 1935: 41, Table V, Map C). Krieger and others have also described an earlier "Falcon focus" and a later "Mier focus" from this area (Suhm, Krieger, and Jelks 1954: 138-42) ignoring MacNeish's earlier designations for apparently closely related if not identical cultures. Suhm, Krieger, and Jelks (1954: 565) report a radiocarbon date of 4650 B.P. ±300 (about 2700 B.C.) for the Falcon focus.

This is the area occupied in the early historic period by the scattered Coahuiltecan bands who, in the early 16th century, clearly had a surviving Archaic culture slightly modified by the addition of the bow and arrow and sparse pottery. This Coastal Plain Archaic extends across the Rio Grande into Mexico and its characteristic artifacts have been noted as intrusives in Periods III, IV, and V of the Huasteca (Kelley 1947a; Ekholm 1944: 488-91, Pl. 55). MacNeish has investigated closely related cultures south of the Rio Grande and reputedly is able to assign them positions in his chronological scheme. Sites of the Monte aspect occur in deeply buried geological deposits along the Rio Grande (Campbell and Frizzell 1949; Aveleyra 1951; Cason 1952).

Western Texas

The Archaic in western Texas includes two principal cultural periods grouped into the Big Bend aspect (Kelley, Campbell, and Lehmer 1940: 23-9) which has already been noted briefly in the discussion of the Desert cultures. The earlier of these is the Pecos River focus, characterized by an elaborate array of artifact types in stone, bone, and perishable materials. The diagnostic projectile point type, Langtry Stemmed (Fig. 2 *15*), is apparently derived from a Gypsum Cave-like point and there are other associated point types (Kelley, Campbell, and Lehmer 1940: 125-7, Fig. 1, Pl. 20 *1, 2*; Suhm, Krieger, and Jelks 1954: 396-7, 438-9, 464-5, 480-1, Pls. 77, 98, 111, 119). Sites of the Pecos River focus occur not only in caves and in the open, but also, in several instances, in buried levels in the Number II alluvial fill, known locally as the Calamity formation. At the very base of this formation, or more probably dating to the underlying erosional disconformity which fairly certainly can be attributed to the Altithermal, are rare sites with a somewhat simpler array of artifact types suggesting an ancestral form of the subsequent Pecos River focus. Stemmed dart points and grinding stones are characteristics of the two known sites of this culture, which is known as the Maravillas complex.

In the upper part of the Calamity formation, in the succeeding erosional interval and continuing into the Kokernot formation, the local equivalent of the Number III formation of the Southwestern alluvial chronology, occur sites and artifacts of the Chisos focus of the Big Bend aspect. The stone complex of the Chisos focus is simpler than that of the earlier Pecos River focus; the artifacts are more crudely made; the sites show thinner occupation. The

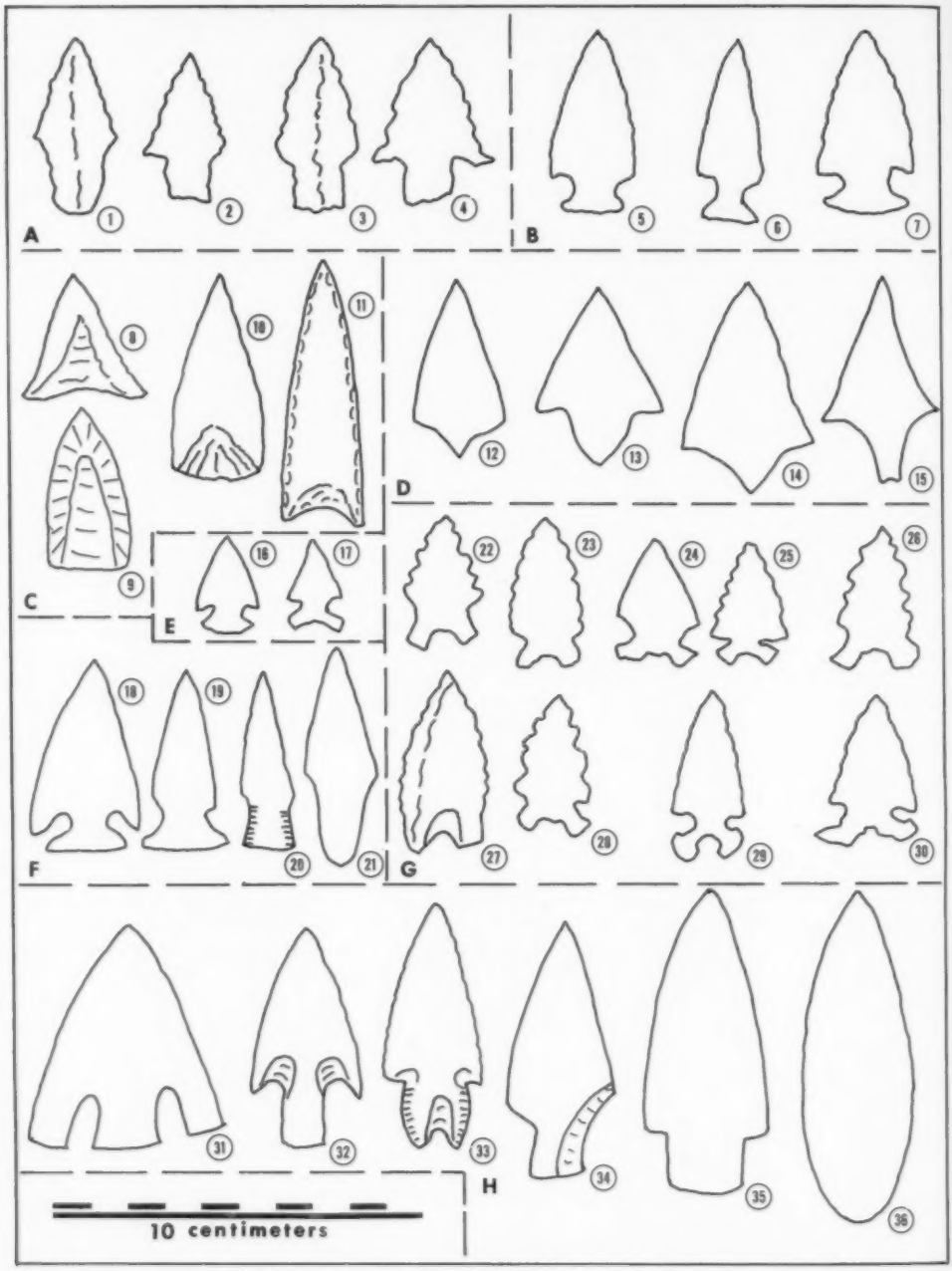


FIG. 2. Principal projectile point types represented in the Desert cultures. *A*, points from the Number I-Number II erosional interval in the southwestern alluvial sequence, probably representing types in use during the Altithermal period: *1, 2*, Ventana-Armagosa points from the Red Sands in Ventana Cave; *3, 4*, Maravillas points from washed cultural material on the I-II disconformity in the Big Bend region; *B*, San Pedro points representing late Archaic

characteristic dart point type is one similar to the Pinto points (Fig. 2 G) of the southwestern Desert cultures. In the latest sites of the Chisos focus are intrusive Southwestern potsherds of types datable to the 12th and 13th centuries of the Christian era, and occasional remains of maize, beans and squash (Kelley, Campbell, and Lehmer 1940). Also, in this same Number III formation are house and village sites of the Bravo Valley aspect, a pottery-making sedentary culture of Southwestern and possibly Mexican affiliations, distinctly non-Archaic in every way.

Interrelationships of the Archaic Cultures of the Central, South, and West Texas Regions

The Round Rock and Clear Fork foci of the Edwards Plateau aspect are equated with the Morhiss and Aransas foci of the Coastal Plain by cross-finds of diagnostic artifact types as well as by basic similarities in trait lists. Thus, specimens of Pedernales Indented Base (Fig. 2 *33*), Nolan Beveled Stem (Fig. 2 *34*), Taylor Thinned Base (Fig. 2 *8*), Baird Beveled Blade (Fig. 2 *9*) and perhaps other Edwards Plateau aspect projectile point types were found at the Kent Crane component of the Aransas focus (Campbell 1952) and at the Morhiss site itself where the identifications are based on my own analysis. Specimens of Bracken Broad Base, Kyle Corner Notched (Fig. 2 *18*), Garcetas Stemmed, Hutto Convex Base (Fig. 2 *16*) and perhaps other Morhiss and Aransas focus projectile point types occur in Round Rock components. In the Morhiss site were also examples of Tortugas Triangular (Fig. 2 *10*), La Salle Lanceolate (Fig. 2 *36*), Cuero Triangular (Fig. 2 *11*) and other projectile point types of the Monte aspect. Along the margins of the southern Coastal Plain near the Balcones fault occur sites in which Monte aspect specimens are regularly mixed with Round Rock-Uvalde focus types, as well as with Langtry Stemmed (Fig. 2 *15*) points from the Pecos River focus to the west. All of this quite certainly indicates close contact and interrelationship of the Archaic cultures of these two regions in the same general time horizon.

According to my own studies of the collections from the Fate Bell Shelter, a large component of the Pecos River focus of the Big Bend aspect, the numerous projectile points included some 50 specimens identifiable as Nolan Beveled Stem (Fig. 2 *34*; Kelley 1947a) of the Clear Fork focus of north central Texas, while another 68 specimens appeared to be a local copy of Nolan Beveled Stem. Furthermore, my own studies show that many specimens of the Pecos River focus diagnostic projectile point type, Langtry Stemmed, have their stems beveled in characteristic Nolan style. Also at Fate Bell Shelter were four corner-tang flint knives, almost certainly intrusive from the Uvalde or Round Rock foci of the Edwards Plateau aspect. Pearce and Jackson (1933: 72-8, 140-1) saw other similarities between what are now called the Pecos River and Round Rock foci. It should be noted that typical "Clear Fork

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types from the Southwest and the Big Bend: *5*, upper levels of the wet midden in Ventana Cave; *6*, San Pedro stage of the Cochise culture; *7*, Chisos focus in the Big Bend; *C*, triangular points from central and southwest Texas: *8*, Taylor Thinned Base; *9*, Baird Beveled Blade; *10*, Tortugas Triangular; *11*, Cuero Triangular; *D*, points in the Gypsum Cave pattern from the Southwest and Texas: *12*, Gypsum point (Nevada, southern California, Arizona); *13*, Manzano point (New Mexico); *14*, Almagre point (western Texas and adjacent sections of Mexico); *15*, Langtry Stemmed, central variant (western Texas); *E*, late Archaic points from central and south Texas: *16*, Hutto Convex Base; *17*, Keechi Concave Base; *F*, middle to late Archaic points from Texas: *18*, Kyle Corner Notched; *19*, Buda Broad Base; *20*, Yarbrough Stemmed; *21*, Wells Stemmed; *G*, types of the Pinto point pattern which range from early to late Archaic in the Southwest and Texas: *22*, *23*, Pinto points from Pinto Basin sites in southern California; *24*, *25*, Chiricahua stage Cochise points from southern Arizona; *26*, San José points from the Grants, New Mexico area: *27*, *28*, Peña Concave Base and Paisano Serrate points from the Chisos focus of the Texas Big Bend region; *29*, Verde Indented Base from late Pecos River focus sites on the Pecos and Rio Grande rivers in southwest Texas; *30*, Frio Flared Stem from the Uvalde focus of the Edwards Plateau aspect in west-central Texas; *H*, point types characteristic of early and middle Archaic in central and southern Texas: *31*, Beaukiss Broad Blade; *32*, Bulverde Barbed; *33*, Pedernales Indented Base; *34*, Nolan Beveled Stem; *35*, Garcetas Broad Blade; *36*, La Salle Lanceolate.

I have not followed the changes in my projectile point typology proposed by Suhm, Krieger, and Jelks (1954). They have combined my Taylor Thinned Base and Baird Beveled Blade points with my Tortugas Triangular point retaining the name of the latter type for the new grouping. They include my Hutto Convex Base points with their Ellis points and also place them with my Bracken Broad Base, Keechi Concave Base, and Buda Broad Base points in their Ensor point category along with several point types which are unfamiliar to me. My Beaukiss Broad Blade type has been broken down into Castroville and Marshall points. Several of my types have been renamed: Kyle Corner Notched points would become Marcos points in the revision suggested by Suhm, Krieger, and Jelks; Garcetas Stemmed or Broad Base points would become Morhiss points; La Salle Lanceolate points would be Refugio points; Cuero Triangular would be replaced by Kinney points. My Verde Indented Base type is not included in Suhm, Krieger, and Jelks (1954).

gouges" also occur in the Pecos River focus. Thus, the Pecos River focus appears to be related especially to the Round Rock and Clear Fork foci of the Edwards Plateau aspect, and perhaps to the Uvalde focus as well. However, there are even closer stylistic ties between the Chisos focus and the Uvalde focus, especially notable in the pattern-identity of their respective diagnostic dart point types Paisano Serrate (Fig. 2 *28*) and Frio Flared Stem (Fig 2 *30*), as well as with the putatively late Verde Indented Base (Fig. 2 *29*) of the Pecos River region. In view, also, of the similar positions of these Archaic cultures in the late geological stratigraphy of their respective areas, their general contemporaneity clearly seems indicated.

Since evidence has been adduced for close relationship and general contemporaneity between the Edwards Plateau aspect and the Aransas-Morhiss-Monte Archaic cultures of the Coastal Plain and between the former and the Big Bend aspect, it would appear almost certain that a similar close relationship must have existed culturally and temporally between the Big Bend aspect and the Coastal Plain Archaic cultures listed. Although the evidence for this is thinner and less certain than that for the other connections, this conclusion does appear justifiable. Langtry Stemmed points occur quite frequently in components of the foci of the Monte aspect, and specimens of the characteristic Monte aspect projectile point type, Tortugas Triangular, occur in components of the Pecos River focus. The occurrence of Monte aspect artifacts in sites deeply buried in alluvium in the lower Rio Grande valley suggests that the Monte aspect may occur in a similar position in the alluvial sequence (Suhm, Krieger, and Jelks 1954: 136-8).

It should be emphasized that in addition to specific trade or contact relationships as outlined here, the Archaic cultures of the three Texas areas discussed are basically similar in artifact inventories and general trait lists, although differing in emphasis, local styles, and regional developments. Thus they certainly are related at least on the *phase* level and they existed throughout the same time horizon.

The Balcones Phase and the Eastern Archaic

Close relationships are visible between the central Texas Archaic cultures and others lying east and northeast of the area. Notably, in the Trinity River region of northeast Texas, Wilson W. Crook, Jr. and R. K. Harris have reported Archaic cultures so similar to those of the Edwards Plateau aspect that they have proposed a new Trinity aspect of the Balcones phase to accommodate them (Crook and Harris 1952; Crook 1952). The two proposed foci of the aspect, the earlier Carrollton focus and the later Elam focus, occur in stratigraphic context in the alluvial formations and terraces of the Trinity River.

The first (TI) or Carrollton Terrace of the Trinity River has two lower beds of gravel and sand—the Hill and Shuler formations—which produce a good Pleistocene faunal assemblage and are referred geologically to the Wisconsin. (The more than 37,000 years ago date for a Clovis Fluted point said to have been found in association with hearths in the upper Shuler formation appears completely unacceptable in terms of the known time range of Clovis Fluted.) These two formations are separated by an erosional interval from two superimposed beds which overlie them — the Albritton and Pattillo formations — which contain only modern fauna and are estimated to be 6000 to 4000 and 3500 to 1750 years old, respectively. A lower flood plain terrace (TO) is represented by the Carter formation, in which are pottery-bearing archaeological sites, possibly of the Wylie focus.

The Carrollton focus has a good central Texas Archaic assemblage with no true polished stone except end-notched and grooved sinker stones of the Waco type. It includes Clear Fork gouges, one intrusive Beaukiss Broad Blade point (Fig. 2 *31*) from the Edwards Plateau aspect and probably specimens of Bulverde Barbed (Fig. 2 *32*) and Buda Broad Base (Fig. 2 *19*) points of that aspect (Suhm, Krieger, and Jelks 1954: 408-9, Pl. 83). It should also be noted that Plainview-like points suggestive of paleo-Indian survivals occur in the Carrollton focus as they do on occasion in the Edwards Plateau aspect. The Waco sinkers noted above also occur in late Round Rock focus sites in central Texas. The Carrollton focus occurs in the upper part of the Albritton formation and the lower part of the Pattillo formation. The Elam focus also is a good Balcones phase Archaic assemblage and apparently contains examples of dart point types Hutto Convex Base (Fig. 2 *16*), Keechi Concave Base (Fig. 2 *17*) and Wells Contracting Stem (Fig. 2 *21*), all of which occur in late Round Rock focus sites in central Texas.

Crook and Harris not only specify the rela-

tionships which exist between the Trinity aspect and Edwards Plateau aspect, but in addition they recognize relationships westward with the southwestern Desert cultures and eastward with the eastern Archaic horizon. They point out specific relationships with the Archaic Grove focus of Oklahoma (Bell and Baerreis 1951: 10-14).

Farther to the south, on the Neches River, is the variant Temple Mound Davis site, reported by Newell and Krieger (1949: 164-78). In the earliest — pre-Temple Mound ceramic — and second "phases" of the occupation of the Davis site occur a number of specimens of projectile point types native to the Edwards Plateau aspect or intrusive into its sites. These include Baird Beveled Blade, Taylor Thinned Base, Bulverde Barbed, Wells Contracting Stem and Yarbrough Stemmed points (Fig. 22 *9, 8, 32, 21, 20*; Newell and Krieger 1949: 164-78, Figs. 57-59). Corn cobs from this same time horizon at the Davis site have produced a radiocarbon date of A.D. 397±175 (C-153), a date perfectly in line for the late stages of the Edwards Plateau aspect. Apparently at the Davis site an Archaic assemblage of lithic elements represents a base to which pottery, agriculture, and mound building had been added, while to the west the Archaic cultures continued largely unmodified.

Still farther south, in the Addicks Basin near Houston, Wheat (1953: 204-30, 238-46, Pls. 35-47) identified a preceramic lithic complex to which pottery and arrowpoints were added in the upper levels. The general lithic complex, aside from later additions, appears Archaic, and bannerstones are now present. Specimens of Pedernales Indented Base, Baird Beveled Blade, and apparently Bulverde Barbed points (Fig. 22, 33, 9, 32; Wheat 1953: Pls. 35, 37, 40) from the Round Rock focus appear as intrusives in the lithic complex. Several distinctive Edwards Plateau elements, including chipped gouges, are missing, however.

Throughout east Texas occur sporadic Archaic horizon components which have never been carefully studied. Suhm and Krieger have recently summarized this material and have lumped the known components into an "East Texas aspect" (Suhm, Krieger and Jelks 1954: 148-51). They point out that although relationships exist with the Archaic materials in central Texas, the strongest relationship is with the eastern Archaic. Thus, extending from northeastern Oklahoma and the Grove focus, through the Trinity aspect of northeastern Texas and the East Texas aspect, to the preceramic levels at the Addicks site we have a series of Archaic cultures which show relationship westward with the Balcones phase and eastward with the eastern Archaic.

Eastward there is apparent continuity of Archaic occupation through Missouri, Arkansas, Illinois, and Tennessee into the nuclear area of the eastern Archaic. Collections from Archaic sites in the Cache River Valley of southern Illinois (unpublished Southern Illinois University Museum work, 1953-56; also MacNeish 1948), from the Modoc Rock Shelter on the Mississippi River (Fowler, Winters, and Parmalee 1956) and from southern Missouri look surprisingly like collections from Balcones phase components in central Texas. Without any doubt at all, the Balcones phase represents a southern and western variant of an Archaic continuum. The principal variations from the eastern Archaic notable in this Texas phase are the gradual loss of polished stone from east to west, and the lack of shell mounds in Balcones phase components. The general way of life, site characteristics, artifact roster, and basic ecological adaptation seem remarkably similar throughout both eastern Archaic and the Balcones phase. The general temporal horizon is identical, but the Balcones phase Archaic survives much later than the eastern Archaic.

The Balcones Phase and the Desert Cultures

The Big Bend aspect of the Balcones phase was also included in the discussion of the Desert cultures. This is in keeping with the intermediate cultural and geographic position of the aspect, which might well be classified with either the Desert cultures or the Balcones phase. Several investigators have pointed out resemblances between the perishable artifacts of the Big Bend aspect and those of the San Juan and Coahuila Basketmakers (Smith 1932; Setzler 1935; Pearce and Jackson 1933). Using lithic complexes as a basis for comparison, one can demonstrate an even closer relationship in artifact inventories, ecological adjustment, and general trait lists between the Big Bend aspect and such Desert culture units as the Ventana-Amargosa I, the Chiricahua-Amargosa II — Pinto-Gypsum — and San Pedro complexes.

Specifically, there are close typological relations between the Maravillas complex points and those of the Ventana-Amargosa I cultures, and they occupy the same position in the geo-

logical stratigraphy, that is, they were apparently in use in Altithermal times. Langtry Stemmed (Fig. 2 *15*) points of the Pecos River focus, especially the variety which MacNeish has named "Almagre points" (Fig. 2 *14*; Suhm, Krieger and Jelks 1954: 396-7, Pl. 77), appear to be typologically equivalent to the Gypsum Cave point pattern of the Desert cultures and to Hibben's Manzano points (Fig. 2 *13*; Hibben and Bryan 1941: 35-6, Pl. 14 *1*). The Paisano Serrate point (Fig. 22 *28*) of the Chisos focus certainly equates with the Chiricahua-Pinto point (Fig. 22 *24, 25*; also Haury 1950, Pl. 22). The Chisos focus also has as regular elements projectile points similar to those of the San Pedro Cochise culture (Fig. 2 6) and of the San José complex from Grants, New Mexico (Fig. 2 *26*; Bryan and Toulouse 1943, Pl. 19 *w-h*).

Additional similarities might be noted but it suffices to say that there appears to be a continuous distribution on a similar temporal horizon of closely related Archaic cultures westward from trans-Pecos Texas to southern California. These cultures occupy a similar position in the alluvial chronology — concentrated in the Number I-II interval and the Number II deposition — and in almost every instance they are associated with modern fauna and overlie levels in which occur extinct fauna and, locally, paleo-Indian artifacts.

The Archaic Horizon

The close ties of the Big Bend aspect with the Edwards Plateau aspect of the Balcones phase, with close relationships between Pecos River, Round Rock, and Clear Fork foci earlier and between Chisos and Uvalde foci later, have already been discussed, as has the evidence for the continuity of culture eastward from Balcones phase to eastern Archaic. It is clear, therefore, that continuous distribution of an Archaic culture and horizon is demonstrable from the Atlantic to the Pacific, linking the eastern Archaic with the southwestern Desert cultures through the geographically and culturally intermediate Balcones phase of Texas.

Through this cultural matrix there is a gradual shift in basic economy between east and west in accord with changes in geographic habitat. In the east, polished stone is a characteristic element of the Archaic cultures, at least on the latest time horizon, while the intensity of this trait diminishes westward, so that it is practically missing in trait inventories of Desert cultures. Conversely, coiled basketry dominates in the west but apparently diminishes eastward. The Balcones phase appears to be the cultural unit in which the greatest differentiation between east and west occurs. Notably, this is also the area of significant change in natural habitat, and consequently, in the Archaic ecology.

Certainly, we can now speak with assurance of a continent-wide Archaic horizon, whatever name we may choose for this widespread series of geographically continuous and culturally similar complexes. The basic culture thus conceptualized is also a true cultural horizon since its principal span of existence appears to have overlapped both the largely earlier paleo-Indian complexes and the later ceramic and agricultural groups, with an intermediate period in which it alone dominated. This continent-wide Archaic also served as the cultural platform on which was erected, and from which evolved, the later ceramic and agricultural complexes in both east and west.

It is not yet clear whether the basic Archaic cultural pattern came into the New World from the Old, or whether it represents a local development in the New World out of an earlier paleo-Indian horizon or out of a still older New World cultural horizon basic to both Archaic and paleo-Indian. Nor is it clear whether the differences noted between Desert cultures and eastern Archaic indicate specializations out of a common Archaic base in diverse habitats, or else represent essentially separate but related cultural strains which met and coalesced in Texas. But, such as yet unanswerable questions should not be allowed to obscure the importance of the emergence of the concept of the Archaic horizon, a concept which should prove of great utility in future studies of both American prehistory and general cultural dynamics.

Southern Illinois University
Carbondale, Ill.
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CALIFORNIAN CULTURES AND THE CONCEPT OF AN ARCHAIC STAGE

CLEMENT W. MEIGHAN

WESTERN archaeologists have almost unanimously shunned the term "Archaic" in describing their finds. In the few cases where the word has been used at all, it has generally been qualified by using quotation marks, a question mark, or some statement indicating the author's belief that this is not a *real* Archaic culture. As a result, none of the described western cultures is conventionally labeled "Archaic." Avoidance of the term has stemmed from two conditions: *a*) a desire to avoid confusing western cultures with those generally called Archaic in the East; and *b*) the temporal implications of the word "Archaic." The continuity of some western cultures leads to a paradox when certain manifestations which actually persisted until the recent historic period are labeled Archaic. As a result of these problems, the literature has tended to emphasize the distinctive features of western cultures and only a few attempts have been made to observe fundamental features of continent-wide distribution.

In order to compare the culture history of the western margin of the continent with that of eastern areas, it is most convenient to discuss western prehistory from two directions: a temporal view, equating early developments on both sides of the continent; and a view of the Archaic as a culture stage, showing the continuity and relative lack of change in the west.

TEMPORAL AND REGIONAL COMPARISONS

Recent radiocarbon dates show three very old dates for a relatively small area of southern California. They include: Scripps Campus, La Jolla, 19,550 B.C.±700 (W-142, Rubin and Suess 1955), Santa Rosa Island, 27,700 B.C.± 2500 (L-290R, Orr 1956) and Texas Street, San Diego, older than 36,050 B.C. (Lamont, unpublished, from George Carter, personal communication). A preliminary discussion of the Santa Rosa Island date has been published by Orr (1956: 7); the other dates are not yet reported in detail. All of these dates are reported to apply to "hearths" although evidence for human utilization of these "hearths" is not yet conclusively demonstrated. Until full publication of the circumstances of the occurrence of the samples is made, it is not possible to assess their validity or significance. It would be premature to accept the early dates at face value, however, since all of them are open to question at the present time. [This was written before the publication of Carter 1957. See Addendum. — EDITOR.]

Much later in time, but still of great importance to western prehistory, are the dates obtained from midden and cemetery material on Santa Rosa Island. There are two dates: 4870 B.C.±160 (L-257) and, an average of three measurements, 5120 B.C.±250 (L-290D, Orr 1956: 5-6). These dates apply both to extensive midden and to cemeteries from which many burials have been taken. The dates imply coastal occupation of California throughout the Altithermal period.

At present the Santa Rosa dates are the oldest coastal dates in the west, although still older dates have been obtained by Cressman on material from inland Oregon. However, on typological grounds it may be assumed that some of the southern California sites are older than the 5000 B.C. surely demonstrated by radiocarbon dates. The Topanga site, for example, with its heavily altered soil and crude chopper-scraper complex, should be considerably older than the described material from Santa Rosa. It has not been possible to obtain organic material from the Topanga site for dating. Detailed artifact comparisons cannot be made until the Santa Rosa specimens are published, yet the Santa Rosa dates suggest that sites like Topanga are likely to be pre-Altithermal, perhaps dating back to 8000 B.C. as a guess.

Recent evidence shows rather clearly that the west coast was occupied as early as any other part of the country, rather than being marginal and only lately settled by migrants from the east or north. There is reason to believe that California was occupied by people who were contemporaneous with the Folsom and perhaps the Clovis cultures of the Southwest and Plains. Unfortunately, the cultural picture of these ancient peoples cannot yet be drawn. The oldest dated cultures have not yet been described, and other remains of presumed antiquity yield only fragmentary information. Hence it is not possible at this writing to make

a cultural comparison between the west coast and other areas on a time level of more than about 5000 years ago, even though the west coast was probably occupied for at least twice that period.

Several finds of human skeletons that appear to be of great age have been made in California. Probably the best contender for contemporaneity with fossil animals is "Los Angeles Man," a skeleton found in excavation of a large drainage ditch in 1936. Nearby, bones of the Imperial elephant (*Archidiskodon*) were recovered, and recent fluorine dating suggests the finds to be of the same age (Heizer 1952: 7). Other "early man" finds are discussed by Heizer (1948, 1952).

Artifacts of the fluted point traditions are generally absent in California. A few scattered points have been reported, but their cultural affiliations are not clear. Points of the Middle Central California culture are frequently concave-based and have basal thinning, suggesting but not duplicating the fluted appearance of Clovis points. The Californian examples are most often of obsidian and are sometimes shaped by very careful pressure flaking. The greatest number of such points is reported from the Borax Lake site in northern California (Harrington 1948). There is considerable divergence of opinion over the position of the Borax Lake site and its fluted points, but there now seems to be general agreement that the points are not to be equated typologically with Folsom points. The temporal placement of the site is also disputed, although it appears to represent the basement complex for the North Coast Ranges (Meighan 1955: 26). The Borax Lake problem is further complicated by the presence of a few points which could be in the Clovis-Folsom tradition. Harrington (1948, Fig. 21, Pl. 14 *a*) illustrates some and I have seen three or four more in the collection of C. C. Post of Berkeley. This group of points is exceptional and anomalous in the Borax Lake collection: the points are of gray or brown flint, although the overwhelming majority of Borax Lake objects is obsidian; the type is not duplicated in the obsidian artifacts; and the workmanship is also unusual compared with the rest of the artifacts from the site. This is not clearly evident from the published illustrations. The possibility should be considered that the convincingly "Folsom" specimens are somehow intrusive and not actually a part of the Borax Lake complex, although there are definitely fluted points of a rather crude sort at the Borax Lake site. Similar fluted points have been found at site Nap-131, which is believed to represent the basement complex for Napa County (Meighan 1953b: 316).

The oldest published cultural remains giving a reasonably complete picture of Californian peoples are those of the Desert cultures of southern California, the Topanga culture from near Los Angeles, and the Early Central California remains from near Sacramento. Several other Californian cultures of presumably equal or greater age are known and currently under study. These include Orr's "Dune Dwellers" on Santa Rosa Island, the lower levels of the West Berkeley site on San Francisco Bay, and the lower levels of the Karlo site in Lassen county, northeastern California. This roster includes cultures separated by millenia in time and by some 800 miles in distance; hence it is not surprising that variation in artifact types may be seen among the cultures named. Indeed, it is a little surprising that not more variation is present.

The features of some sample cultures (insofar as they are available to me) are indicated in a schematic way in Figures 1 through 4. The correlation chart (Fig. 6) is arranged according to the areas shown in Figure 5. The charts and illustrations have been prepared to substitute for lengthy descriptive text. They are all subject to change, particularly the correlation chart which would be prepared quite differently by other western archaeologists. I have followed a conservative dating throughout and have placed on the chart only those cultures which have been defined to some extent in publication. There are at least a dozen additional named complexes, some of which will prove to be very important to our understanding of western prehistory. I have omitted cultures of disputed existence — Texas Street and Malpais, for example — as well as those not yet published by their discoverers. Dates given on the chart are based on radiocarbon dating, estimates of the discoverers, and typological crossties. I have accepted dates estimated by the various authors except where a contrary view has been developed in print; in such cases I have tried to follow the majority opinion as well as I could judge it. The charts may emphasize the stylistic differences; a discussion of the general similarities is given below.

Southern California is characterized, in the early period, by cultures called "Early Milling

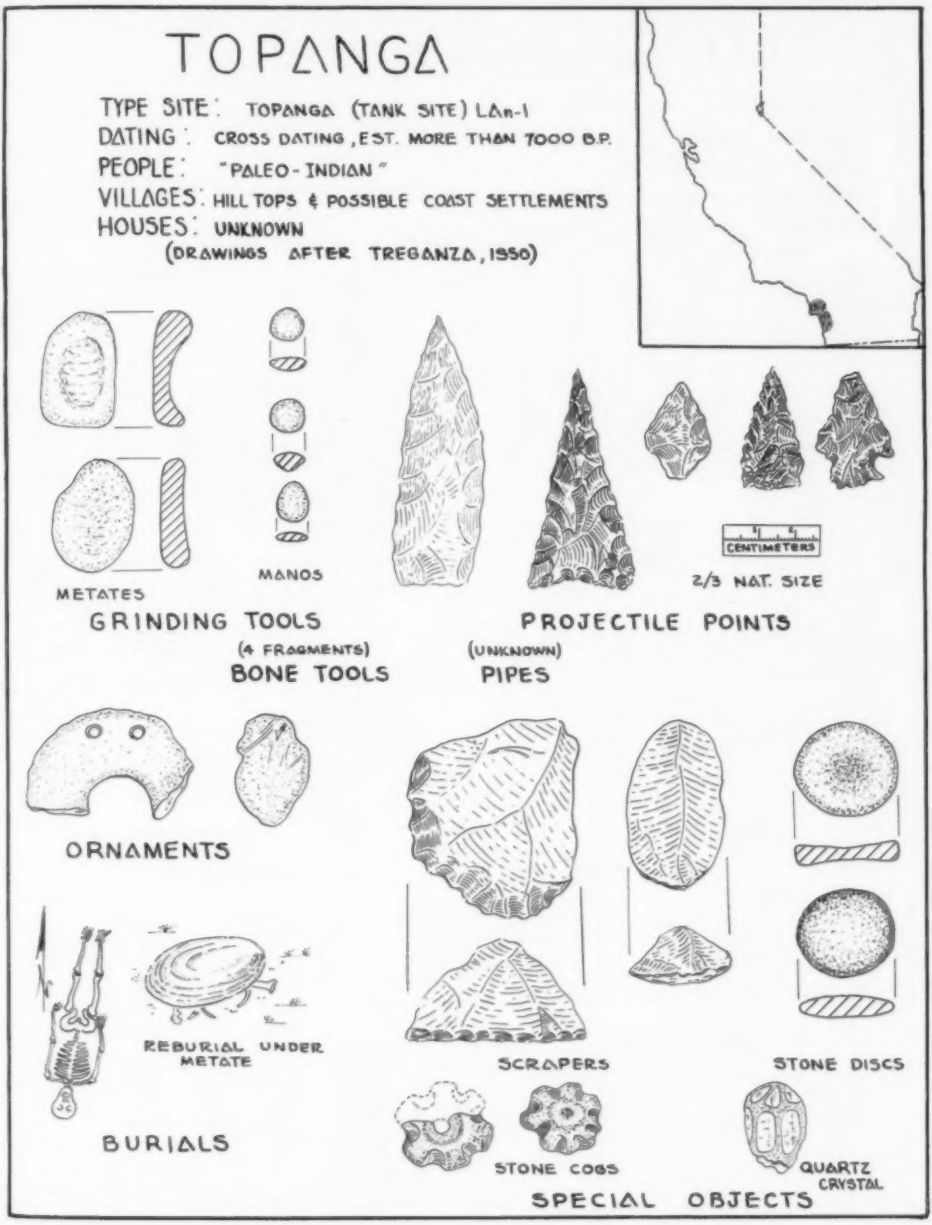

FIG. 1. Traits characteristic of the Topanga culture.

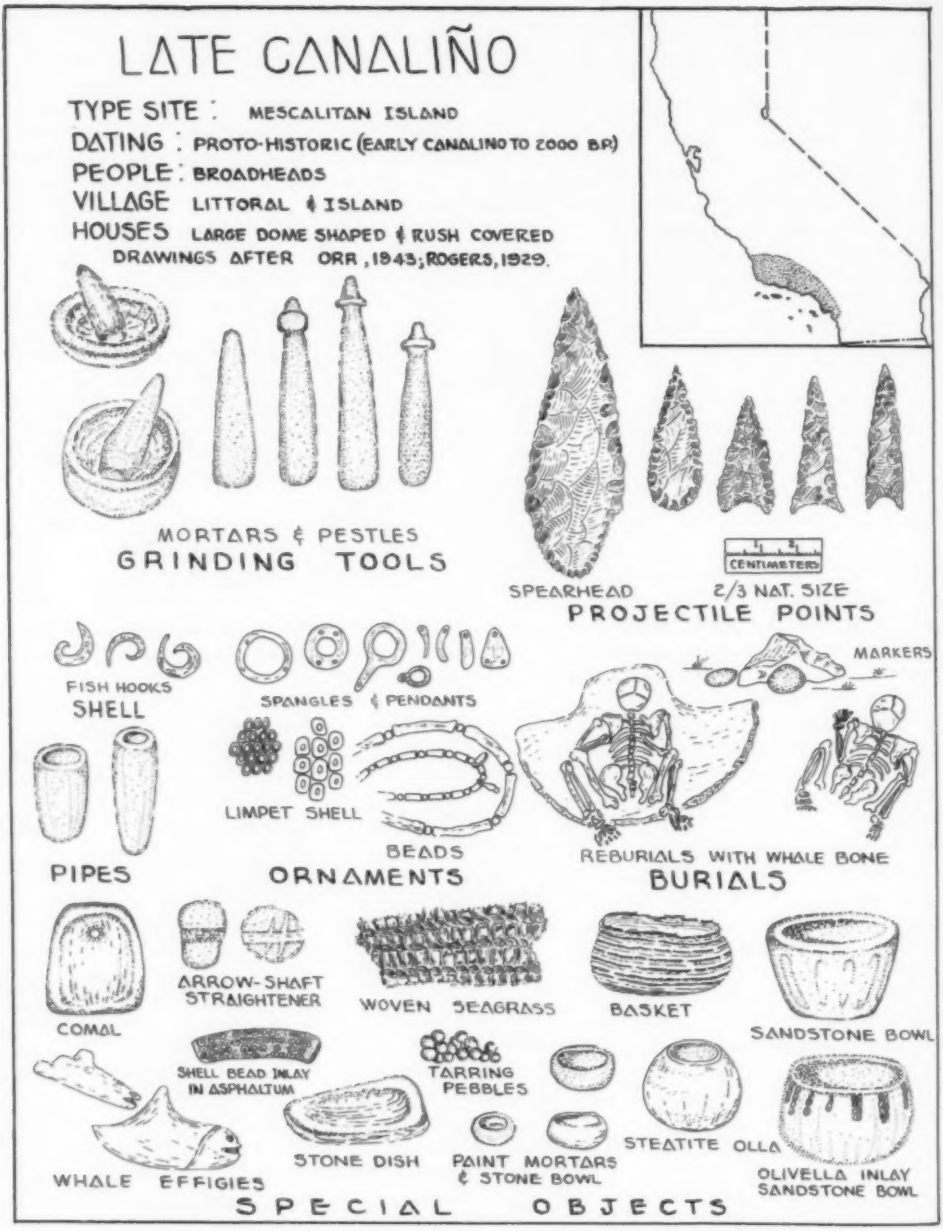

FIG. 2. Traits characteristic of Late Canaliño culture.

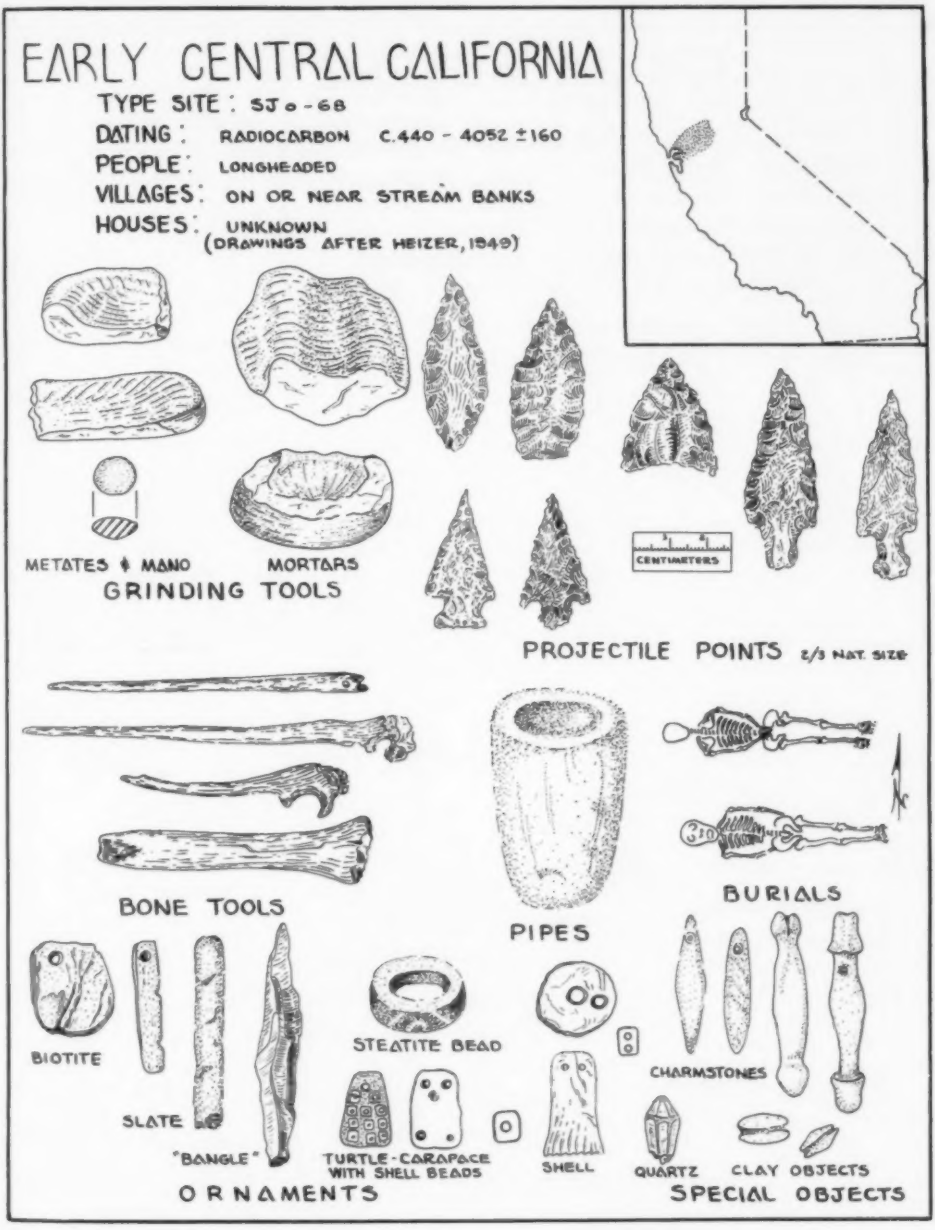

FIG. 3. Traits characteristic of early Central California culture.

FIG. 4. Traits characteristic of late Central California culture (Phase II).

Stone Cultures" by Wallace (1955). These are most clearly seen along the coastal strip; the inland cultures of the desert appear to be somewhat different, but this may be a function of comparing midden sites with surface sites. There is a considerable overlap of artifact types between desert and coastal cultures, although some specific differences are also seen. The commonest specimens throughout the area are metates, often containing a very deep groove, and crude percussion-flaked choppers and scrapers. Points of several varieties occur, but they are numerically rare in comparison to the crude material. Topanga yielded 31 points and over 1500 percussion tools (Treganza and Malamud 1950); the Zuma Creek site yielded ten points (of which two are most likely recent intrusions) and over 400 percussion-flaked scrapers and choppers (Peck 1955). Similarities between these cultures and the early phases of Cochise have often been noted, and it is true that the same kinds of artifacts occur in both cultures. However, proportions of representative types are different; some of the California cultures seem to place more emphasis on tools of a "palaeolithic" appearance. When adequate dating evidence is available, it may be shown that the Cochise culture represents an intrusion from the west, displacing or replacing the mammoth hunters of sites like Naco and Lehner. However, this conclusion is speculative; present information suggests it as a possibility, but it cannot be verified.

Surface collection or casual excavation of sites like Topanga can yield a sizeable aggregation of crude core tools without turning up either grinding implements or projectile points. This is particularly true for the early remains of San Diego County and Baja California, which seem to have experienced a remarkable cultural lag even within the generally isolated Californian region. For this reason, workers in the west are apt to believe that they have found complexes of extreme simplicity, and references to such complexes have appeared under names such as "early lithic," "palaeolithic," and "pre-projectile point" or "non-projectile point." I have tried to verify the reality of such complexes by careful search of the literature, and have concluded that all claims of this nature are likely to be due to inadequate sampling or to sampling of a workshop or quarry rather than a habitation area. The Texas Street material is a special case. In my opinion the claimed artifacts are actually broken rocks of natural origin. If these are indeed accepted as artifacts, then we must conclude that there is a pre-projectile point culture on the west coast. I think it possible that a culture of "palaeolithic" appearance may yet be demonstrated for the west coast, particularly in Baja California and other marginal areas, but at the present time the evidence for such a culture is inconclusive and highly vulnerable to the criticisms suggested above. It must be emphasized that all of the Californian complexes which include a controlled and reasonably large sample of artifacts have both grinding tools and projectile points.

The Central California cultures of the early period show some similarities to those of southern California, but in general the Central California remains show a more advanced technology in that more attention is paid to finished objects and aesthetic elaboration. There is hence a much smaller relative number of core tools. Milling stones are also relatively scarce, only three being reported for Early Central California (Heizer 1949: 20).

The Karlo site in Lassen County is of particular interest because it shows artifact similarities to the Great Basin on the one hand and to Early Central California on the other. So far as the general cultural development goes, the site reveals a pattern not dissimilar from the other early cultures just discussed.

All these complexes are most similar to the cultures called Archaic in the east, and they also occupy the same approximate time period — from about the time of Christ to 3000 B.C. The Californian cultures do not represent big game hunters of the Folsom type. Rather, the Californians seem to have exploited a considerable range of resources from the earliest time, including not only the available animals, large and small, but also plant products. There was regional variation in the food resources available, and also in the relative emphasis given to plant as opposed to animal foods. In at least some of the California cultures, plant foods were probably as important as or more important than game. There is evidence for a fair amount of foraging or general collecting and hunting in the variety of animal species present in some sites and in the use of mussels, rodents, small birds, and similar resources.

The early Californian cultures show a number of differences from the Archaic cultures of the east, in both their general appearance and in the specific kinds of artifacts found. Among the artifacts found in one or another of the

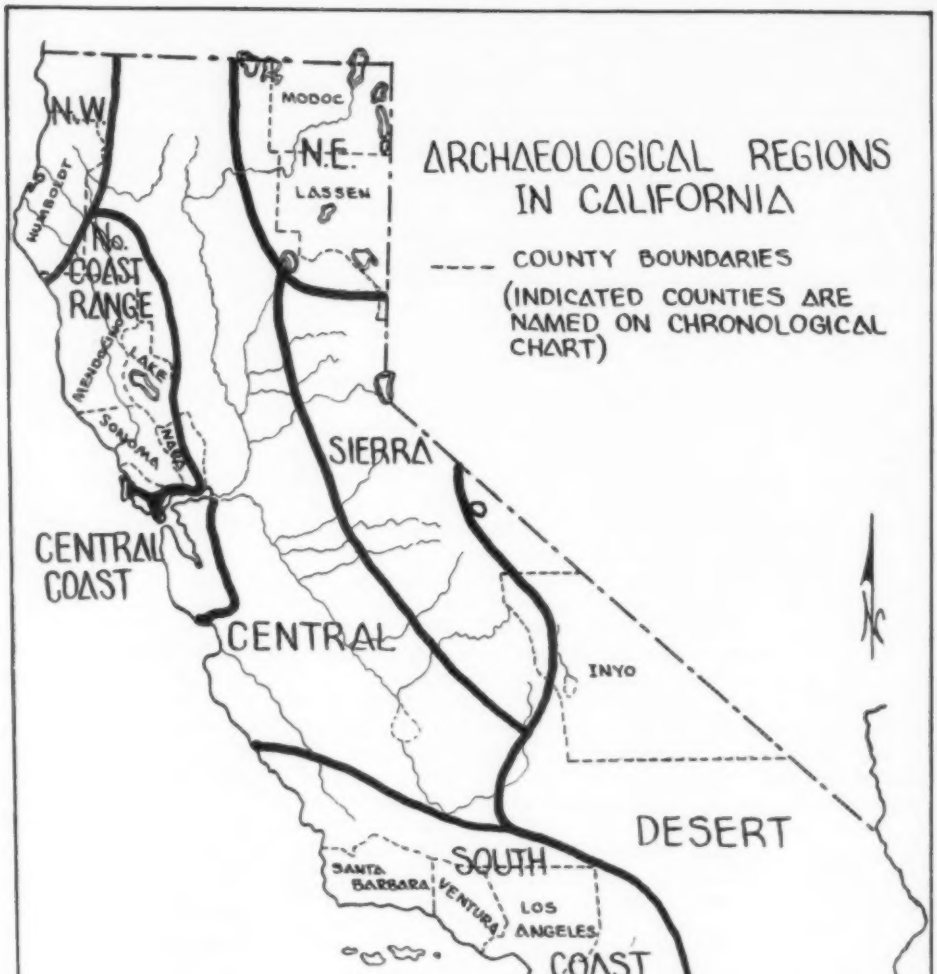

FIG. 5. Archaeological regions in California.

eastern Archaic cultures, the following do not occur in California:

Bannerstones. The winged forms are entirely absent. "Boatstones" presumed to be spear-thrower weights do occur in California, but only a few have been found (Heizer and Elsasser 1953: 26). Boatstones are not found in any of the cultures so far discussed here.

Axes and adzes. There are a few grooved axes from the Sierras, possibly native to California, but in general Californians used percussion-flaked choppers instead of celts or axes. Most of the functional stone tools in California are made of chipped rather than of ground stone; an exception is the grinding stone, but this is often shaped by use rather than design.

Pottery. Pottery does not occur at all in most of California, and its introduction is very late (after A.D. 1000) in the southern and eastern areas where it is found.

On the other hand, some specific similarities between the eastern Archaic and the early cultures of California — particularly Early and Middle Central California — have been noted (Beardsley 1948: 22-5). One of the most striking of these is the common occurrence of plummets or charmstones, an artifact form which is very rare or absent in much of North America. Compare examples from Early Central California illustrated by Heizer (1949), with eastern specimens in Griffin 1952b, Figs. 13 *d*; 96 *o*; 138 *c*; 181 *b*, *d*; 184 *d*. The cultures represented in the East include Frontenac, Baumer, Deptford, Weeden Island, St. Johns I, and various Archaic cultures in the Southeast. No intensive comparison can be made here, but it is noted that this artifact form is generally associated with the older and simpler complexes. Charmstones or plummets may well be a diagnostic of an Archaic culture *stage*. The California examples are more abundant, more diversified, and in general better made than their eastern counterparts, and specific typological similarity is not demonstrated. Charmstones continued in use in California until the historic period and there is evidence for their use as hunting fetishes and good luck charms. Another artifact of common occurrence is the baked clay object believed to be used for cooking in baskets by stone boiling, found in Central California, Poverty Point, and Tchefuncte. Such congruence may well be due to similar responses to similar environmental conditions, that is, lack of stone. A number of general artifacts are also shared by east and west on this time level, including such things as bone fish spears, stemmed points, simple shell ornaments, and bone whistles.

In spite of east-west similarities, it is not possible to show any direct historical connection between the cultures on both sides of the continent. If a detailed trait list of comparisons is compiled, no two cultures appear to share a significant number of features. Rather, the western culture will share one element with one eastern culture and another with an entirely different culture, often widely separated in time and space from the first. Such a scattering of similarities can be most readily explained as due to sharing of a common cultural stage — all were hunters and gatherers with a relatively simple technology.

To summarize this discussion, the following points may be made.

1. The similarities between eastern and western cultures lend support to the idea of a continent-wide distribution of Archaic hunters and gatherers between about 2000 and 5000 B.C.

2. The differences between eastern and western cultures of this period emphasize a diversity of origins. The oldest of the Californian complexes show evidence of having already attained adaptation to particular environmental conditions on the west coast. The Californian complexes are therefore already specialized, environmentally speaking, even though their technology can be called "generalized Archaic." This point is discussed in more detail in the following section. The suggestion is that the western complexes developed in place out of an older and simpler cultural stratum.

THE ARCHAIC AS A CULTURAL STAGE

California provides one of the best regions for definition of an Archaic stage, since most of the Californian tribes were living examples of an Archaic stage of culture at the time of European discovery. Because of California's marginal position, isolated by deserts and the Sierra Nevada, the inhabitants of the state had limited contact with outsiders, and their cultures reveal a slowness in technological change which is often mentioned as one of the principal characteristics of the region.

Except for groups along the Colorado River, all of the California Indians were hunters and gatherers until the time of European and American settlement. They had no agriculture, no

Correlations in California Archaeology

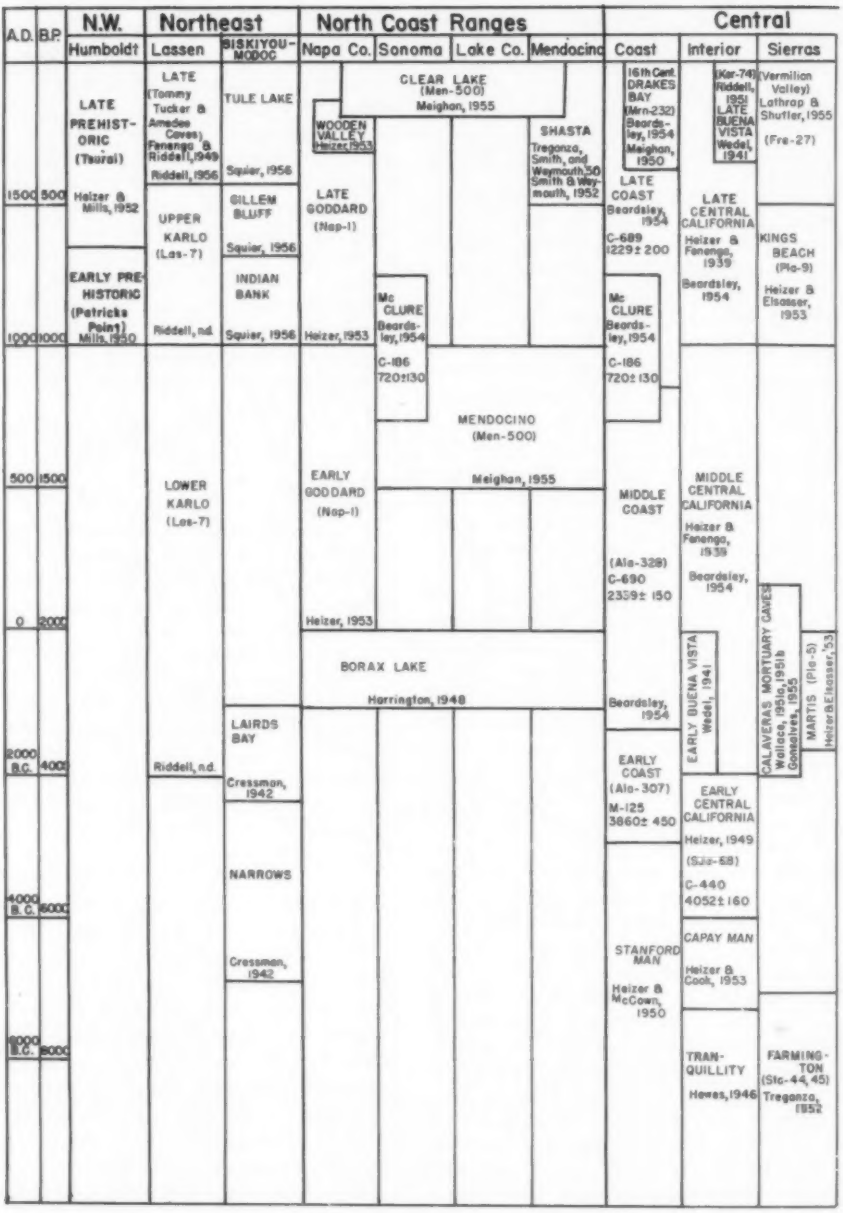

FIG. 6. Correlations in California archaeology. Riddell, n.d., refers to Riddell 1956b.

ARCHAEOLOGICAL COMPLEXES - YUMAN
SITES AND AREAS - (Vermilion Valley) (Las-7)
REFERENCES - Riddell, 1956

RADIOCARBON SAMPLES - C-186 (Dates are B.P.)
SKELETAL FIND - CAPAY MAN

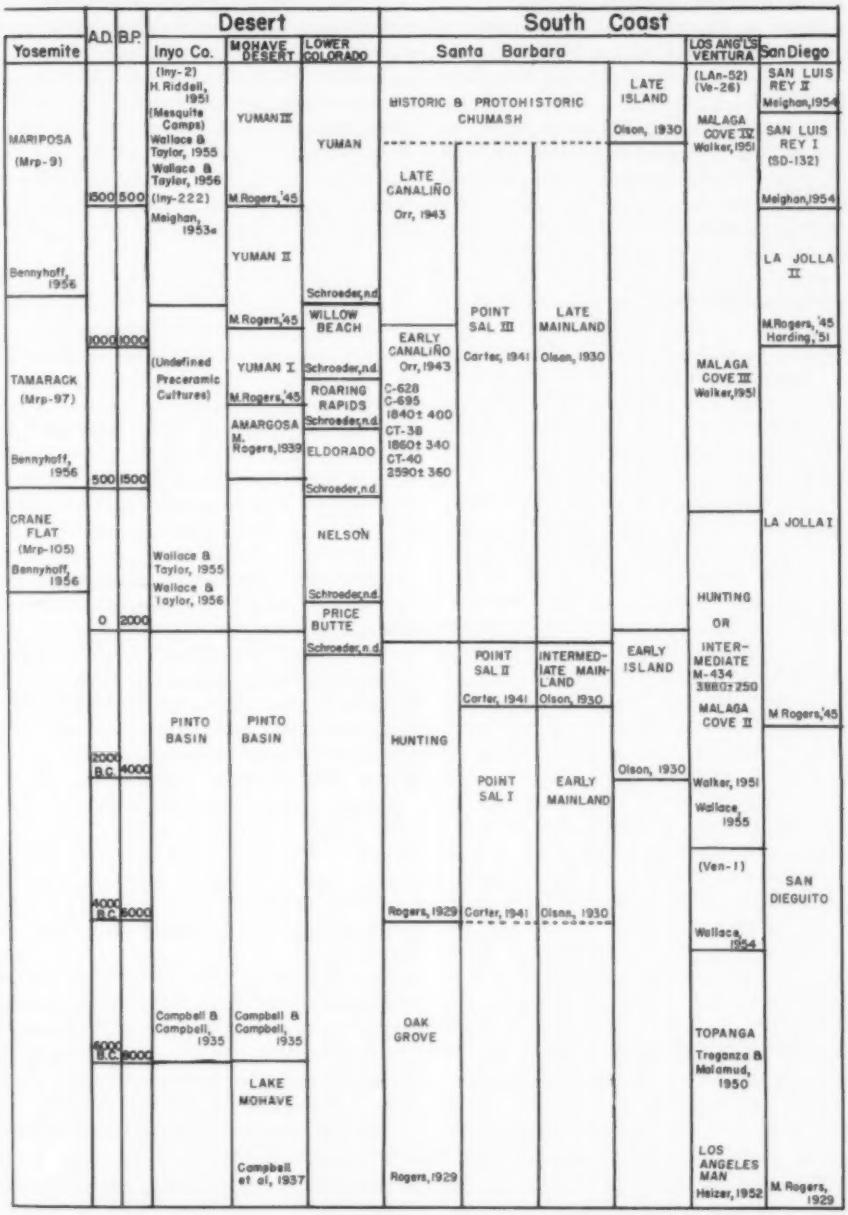

FIG. 6. Continued. Schroeder, n.d., refers to Schroeder 1952a, 1952b.

domesticated animals except the dog — and not even dogs for some groups — and no pottery save for some southern groups who got pottery very late from eastern contacts.

In addition to these general appearances of simplicity, several specific cultural elements can be shown to have persisted through very long periods of time. In Southern California, the milling stone as a grinding implement served as a basic tool from the earliest defined cultures to the historic period—a poorly dated sequence but one which certainly spanned several thousand years. Despite minor changes in form, nothing as distinctive as the Southwestern trough metate developed in California, and many individual specimens out of context could not be dated any closer than "somewhere between 5000 B.C. and A.D. 1800." Many of the simpler shell ornaments have a similar time span. Some objects of a ritual or fetish nature likewise continue throughout, including not only such natural items as quartz crystals, but also the charmstones or plummets characteristic of Central California. For charmstones there are again minor stylistic variations, but the objects are abundant from horizons dated at more than 4000 years ago down to and including the historic present. The general similarity through time is clearly indicated by Beardsley (1948, Pl. 1), whose chart of artifact types is now known to span several millenia.

Such a continuity of Californian cultures leads to some confusion in applying "Archaic" as a label. If we identify the Central California culture of 4000 years ago as Archaic, we are surprised to find that essentially the same culture was functioning 200 years ago as well. This is not to say that cultures at both ends of the time scale are identical, for archaeologists can and do define cultural horizons marked by changes in artifact style, the introduction of new elements, and the disappearance of some old ones. Yet the basic and significant features of the cultures — their subsistence patterns, social organization, and religion, insofar as these may be inferred from the archaeological record, remain remarkably stable throughout not centuries but millenia. This situation has been somewhat vexing to the archaeologist seeking for markers of cultural and chronological difference in California, but for purposes of the present study it is more of a help than a hindrance. This is because we can utilize ethnographic information as a check, with some confidence that it reflects the conditions of the past. It goes without saying that the recent California Indians did not have a culture identical to that of several thousand years before; still, these tribes come closer than any others to showing us what the Archaic cultural stage looks like "in the flesh." A judicious use of ethnographic information to check and supplement the archaeological record may therefore afford a more lifelike picture of Archaic peoples than can be derived in regions where the Archaic culture stage was replaced by other developments a long time ago.

Californian Cultures Included in an Archaic Stage

Although basing their description of an Archaic stage primarily on eastern data, Willey and Phillips (1955) have presented a summary which conforms in nearly every detail to the Californian picture as well. As a preliminary comment, I would include in the Archaic stage not only the later Californian cultures but also many which they considered as possibly belonging to their base culture labeled Early Lithic. Scarcity of site reports and a virtual absence of dependable absolute dates make the earlier Californian material subject to some honest differences of opinion. However, using some of the important criteria of the Willey-Phillips outline — including presence of ground stone, some accumulation of midden indicating temporal continuity for villages, evidence of reliance upon coastal resources — I would include within the Archaic stage such cultures as Topanga, Oak Grove, and similar manifestations called "Early Milling Stone Cultures" by Wallace (1955), Borax Lake, and the Buena Vista site in its entirety. I also believe all of the Calaveras mortuary caves to be part of the Archaic tradition. Dating of such caves is disputed, but the similarity of artifacts from the caves with those of Early and Middle California is so great that it is difficult to believe in greater antiquity for the caves (Wallace 1951a, 1951b; Gonsalves 1955). Regardless of their absolute dates, the artifacts reflect an Archaic stage as defined by Willey and Phillips.

Lest this seem like an indiscriminate lumping of everything on the west coast into one catch-all category, a few brief comments on the western Early Lithic are necessary here. To judge from the available published information, complexes which *may* be definable as Early

Lithic in the Willey-Phillips scheme include Farmington, San Dieguito I, and Playa. Possibly the Lake Mohave site and the earlier manifestations of the La Jolla culture in San Diego County belong in this category as well. All of these give some indications of being not only typologically crude but also close to the basement cultures of their local regions. However, much additional information is necessary before such a classification of these cultures can be made. Many questions, both chronological and cultural, remain to be worked out in detail. If the presence of grinding tools marks the separation of the Archaic from the Early Lithic, it may prove to be necessary to classify all of the named cultures except Farmington as Archaic; relatively small artifact samples prevent a final judgment on this question.

The general marginal conservatism of Californian cultures has already been mentioned. Within the state there are some regions which are marginal even to Californian cultures, where outside contacts were almost nil. Southern San Diego County and the adjacent peninsula of Baja California are good examples. Here, typological crudity is of virtually no significance in dating. The region appears to have maintained very simple cultural patterns until the protohistoric period, and sites known to be relatively late yield an artifact complex of "Lower Palaeolithic" appearance, containing the coarsest of percussion-flaked implements. Some sites of this sort no doubt have very great antiquity, but the extreme marginal survival of crude artifact types makes this region one of the most difficult to divide into chronological units.

Absence of Post-Archaic in California

So far as post-Archaic developments are concerned, except for the few Colorado River tribes, none of the Californian cultures acquired agriculture. Hence for practical purposes there is no post-Archaic stage for California.

It is most important to note that the Archaic stage is not necessarily inferior in its subsistence techniques to simple agricultural communities. Where the environment is favorable, as it was in all of California except the desert regions, the people may work out such an efficient ecological adaptation that they are actually better off than developmental agricultural peoples. The later Indians of southern coastal California, whose livelihood was based upon a maritime economy, maintained larger and more prosperous communities than any of the agricultural groups of the Colorado River, and indeed than all of the Southwestern groups except those living in the most elaborate of the Southwestern sites. As has been suggested before (Jennings and others 1956: 108-10), the failure of the "Archaic" Californians to adopt agriculture was not due to their stupidity or to environmental deficiencies, but simply to the fact that they were relatively well off and saw no particular advantage to agriculture as a way of making a living. As clearly stated by Willey and Phillips (1955) in their suggestion of a "Preformative" stage, agriculture has no particular advantages to offer hunting and gathering groups until farming techniques and storage facilities are well developed. Agriculture appears superior only in retrospect; the individual who begins to grow crops certainly does not see himself as revolutionizing his culture, nor is he likely to perceive major improvements in his own living until quite a long time has elapsed. The fact that California supported the greatest density of aboriginal population in the United States *without* agriculture is of the greatest significance to this discussion.

Economic Features of the California Archaic

Although the basic economy of the Californian cultures was hunting and gathering, within this broad category the region supported a considerable diversity of economic techniques. The remarkable geographic variability of California, with elevations from 200 feet below sea level to 14,000 above, rainfall from less than 2 inches to well over 100 inches annually, and the tremendous diversity of plant and animal resources, provided the Californian peoples with a variety of ecological niches. From the earliest known Archaic cultures, the Californians were already rather closely adapted to the kind of hunting and gathering necessary for existence in one of the specialized ecological regions within the state. Recent attention to the analysis of midden components on the west coast has provided us with some details of the different hunting and gathering emphasis in different areas. The following broad categories may be recognized.

1. Primary dependence upon plant seeds and small game. The perishable nature of foods utilized makes this one of the most difficult of environmental adaptations to define archaeologically. However, living desert Indians of

California, in particular the Cahuilla, provide a good picture of such environmental use. Archaeologically, all of the Cochise-like remains probably reflect the seed-gathering economy. The Oak Grove and Topanga cultures are Californian representatives of this group, as are all of the recent desert cultures, historic and prehistoric.

2. An economy based upon acorns, fish, birds, and larger game animals such as deer and elk. This is typical of the central valleys and most of the mountainous areas of the state.

3. A maritime economy based upon resources of the Pacific Ocean. There is a wide divergence within this category. Some groups depended primarily upon shellfish, others upon hunting sea mammals, still others upon fish. Some specific examples follow.

a) One small group (protohistoric) in northern California had a diet composed of waterfowl, crabs, and clams, apparently in that order of importance.

b) Some northern Californian groups, many of the Monterey coast groups, and the earlier southern California coastal peoples, appear to have subsisted primarily on shellfish which were collected from the rocks, particularly mussels and abalones.

c) Several coastal cultures show a heavy dependence upon sea-mammal hunting for seals, sea lions, sea otters, and dolphins; shellfish were probably mainly a supplement for these groups.

d) Late southern California cultures depended heavily upon ocean fishing, including game fish like tuna, barracuda, and swordfish.

Some important conclusions may be drawn from this diversity. In the first place, it is apparent that Archaic economies are not generalized, but may be highly specialized — closely adapted to the resources of a small region whose inhabitants have a thorough knowledge of their environment. On the positive side, such adaptation led to greater population, demonstrable archaeologically in the presence of midden sites of considerable depth and extent. On the other hand, we may see in this specialization the beginnings of cultural divergence and cultural isolation, leading to the many small tribes and the linguistic variability characterizing California in the historic period.

Both archaeological and ethnographic information show another important feature of the close ecological adaptation, namely the presence of some selection of part of the available resources. Although the people knew and used nearly all of the edible resources available to them, they frequently emphasized a portion of these resources as the major element of the diet and utilized other parts of the environment to a lesser extent. In some cases selection of resources was dictated by the technology (as among coastal peoples who utilized shellfish but lacked the boats and gear to acquire deepwater fish), but in some cases it appears that simple cultural choice played a part. A good example of this can be seen in modern Seri culture — the Seri are fishermen who have abundant shellfish available. However, they consider shellfish an inferior food and eat shellfish only for variety and when other foods are in short supply. Such a choice is probably the explanation for certain Californian middens which show a great predominance of particular foods and a near absence of other resources which must have been present in about the same amounts.

The technology of the Archaic Californians includes ground stone in a diversity of forms but concentrated in two main categories: grinding implements — mortars, pestles, manos, metates — and ornamental devices — charmstones, pipes, and so forth. There are some exceptions, but most of the tools aside from grinding tools are made of chipped stone. Some sort of projectile weapon, atlatl or bow and arrow, was universal, although it seems to have been of limited importance to some of the gathering economies.

Some of the desert groups had pottery in late times, but the art of pottery making was generally absent. Bowls of steatite and other stone were used to a limited extent, but the emphasis in container manufacture was no doubt on basketry. Only scattered finds attest this statement for the prehistoric period, but all dry caves so far excavated have yielded a relative abundance of basketry and it may be assumed that the ethnographic importance of this craft extended back into the distant past.

Bone working was abundant in many, although not all, of the Archaic cultures. Bone objects of wide distribution include fish gorges, pointed awls and awl-like instruments in a variety of forms, whistles, fishspears, and wedges. The latter afford evidence of woodworking, but virtually no examples of wooden objects have been found.

Marine shells were widely used for ornaments and occur in sites throughout California. A favorite shell was the iridescent *Haliotis* (abalone) of several species, although most other available shells were used by one or another of the Californian groups.

Californian technology shows few devices of any degree of technological complexity; nearly all of the objects found are simple and basic tools known widely in other areas of the world. However, although the technology was simple it would not be correct to call it crude, except for some southern California complexes like La Jolla. Nearly all objects are finished pieces executed with control and precision; careless or haphazard workmanship is the exception rather than the rule.

Social Features of the California Archaic

The following social features may be inferred.

1. The largest political unit was no doubt the village, ranging in size from a few to several hundred persons. Larger aggregations may have occasionally come under the authority of a ruler, but to judge from the customs of the recent California tribes, such larger political units were no doubt rare and of short duration.

2. There was a definite stratification of society, but this was primarily a recognition of the superiority of individuals rather than classes. A few individuals in each village were sorted out for special treatment in mortuary rites; these people usually have burial offerings in greater quantity and sometimes more fancy quality than the bulk of the people. Yet the social distance between high and low was not great and probably rested upon personal qualities rather than inherited status. Social distinctions apparently were not made on the basis of sex, for the special individuals may be of either sex in nearly all archaeological complexes. Age may have been a primary factor for segregating the upper groups, as among many living peoples, but archaeological evidence in this matter is very limited due to lack of skeletal studies.

3. Warfare on a small scale was prevalent, mostly by ambush. Trophy heads were taken by some groups. Organized and persistent warfare is not revealed in the archaeology of California, however; few sites look as if they had been selected with an eye to defensive possibilities, and there are no indications of palisades or other constructed defenses.

4. Trade over long distances was common. Much of this was hand-to-hand trade with articles being passed from group to group. However, ethnographically there are records of trading trips of 300 to 400 miles, and we cannot overlook the possibility that such trips were made in the prehistoric period as well.

Religious Features of the California Archaic

Religion is always one of the most difficult aspects of culture to interpret from archaeological evidence, but a few general statements can be made. The most obvious feature of the archaeological finds which attests to religious beliefs lies in the mortuary practices, which are everywhere formalized to a more or less standard pattern. There are some indications of a simple "cult of the dead" in the presence of mourning sites in southern California and the occurrence of fairly elaborate burial offerings in some complexes.

Several objects which had a fetish or shamanistic significance among the living Californian tribes occur widely in the archaeological remains from very early periods. These include charmstones, quartz crystals, and pipes or sucking tubes, all of which are standard shaman's equipment in many historic Californian groups. Such objects were used by living Indians in curing, sorcery, and control of nature. Their significance in the prehistoric period is very likely the same.

There is no clearly defined mortuary treatment which enables us to recognize the tomb of a priest or shaman. It is likely that such individuals were part-time specialists — individuals with recognized supernatural powers. Like political heads, who may well have been the same individuals in many cases, shamans were probably recognized on the basis of personal qualities rather than membership in a particular social group.

Cultural Elaboration Through Time

Although an Archaic technology persisted throughout aboriginal California until historic times, it would be incorrect to assume that the relative constancy of artifacts represents no cultural change. California prehistory shows a continuous search for more efficient adaptation to the environment, and the later cultures may be quite different from the early ones in the efficiency of their subsistence techniques. The difference between California and most other parts

of North America is that the Californians devoted their interests to improving their lot while maintaining cultures that belong in the Archaic pattern rather than by substituting agricultural techniques. That they succeeded is shown by a population that increased through time, and by greater numbers and more kinds of artifacts. In addition, there is an increased elaboration of artifacts, with more attention being paid to artistic embellishment and the production of ornaments and other nonfunctional objects. Compare Topanga (Fig. 24) and Canaliño (Fig. 25) for example. Part of the apparent increase in artifact types through time is the result of differential preservation of objects — in older sites like Topanga or even Borax Lake, soil conditions destroy bone and shell objects. Still, there can be little question that more and fancier objects were made in the later periods.

Another reflection of improved "Archaic" economy is seen in the shift in reliance from one resource to another. The early cultures of southern California were essentially land-oriented, basing their living upon seeds and land animals. When they did use the resources of the sea, they collected the obvious and easy-to-get shellfish such as mussels and abalones. Through time there appears a shift to marine resources, the culmination being the fishing economy of the Canaliño. Such a change permitted greatly increased population, centers of population housing over 1000 people, and greatly increased leisure time for the production of art objects and ceremonial paraphernalia. In terms of population increase, the southern Californians developed as fast and as far as the Southwestern agriculturalists. Other segments of the Californian population did not experience as great an increase, probably largely because their local environments did not permit as greatly enriched exploitation. However, the general picture is one of experimentation and cultural change with recent cultures somewhat better adapted to the environment.

Understanding of Californian culture history can perhaps be clarified by reference to the models for culture change defined by one of the 1955 seminars in archaeology. In terms of the models (Haury and others 1956: 43-4) California represents a Direct Tradition in its persistence of basic tool types. However, the Californian use of subsistence resources represents an Elaborating Tradition of ornaments, art, and other leisure-time activities. All of this is taking place within the framework of an Archaic cultural stage. Hence, although it may be useful to retain the concept of an Archaic stage for some purposes, many complex factors remain to be isolated and defined.

It is unfortunate that current appraisal of the changes within California must be on an impressionistic basis. Detailed definition of the ecological shifts may provide a basis for a more discriminating understanding of Archaic cultures in general. The road to clear understanding of the Californian cultures now lies in such studies as settlement patterns and quantitative midden analysis. The quantitative approach outlined by Heizer and Cook (1956) and demonstrated by them in several recent papers will ultimately permit recognition of detailed changes in ecological adjustment, along with correlated population shifts.

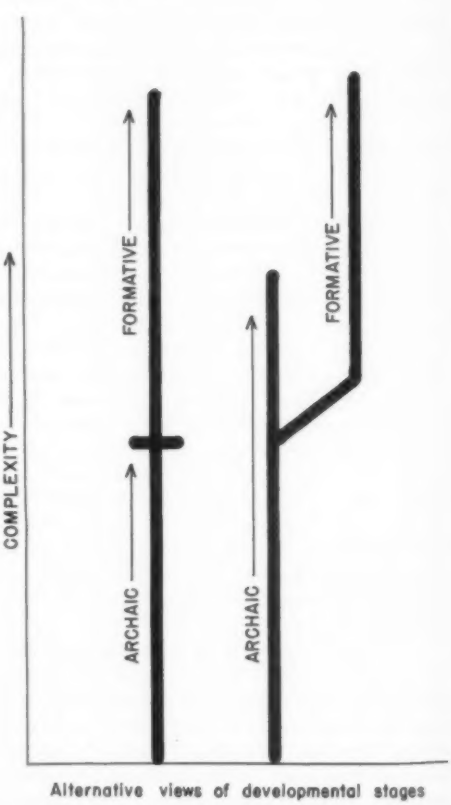

FIG. 7. Alternative views of developmental stages.

ADDENDUM

Since the preceding discussion was written, a number of significant contributions to California archaeology have appeared. It is not feasible to include discussion of all of them, but two are important in bringing this paper up to date.

The first is the book by George Carter (1957) in which there is a great mass of material dealing with the presumed very ancient California cultures mentioned briefly in this report. It is beyond the scope of the present paper to consider in detail the various lines of evidence utilized by Carter, including soil formation, geology, and climatology as well as archaeology. However, speaking of the archaeological discussion only, I still feel that the *archaeological* evidence is entirely inadequate to support the existence of "Pleistocene man." Most of the "artifacts" presented as evidence seem to me to be naturally-fractured rocks; the acceptable artifacts are all types known to occur in relatively recent times and their archaeological context is not unquestionable. There is considerable published archaeological evidence not in agreement with Carter's interpretation which is not considered in his book.

So far as the theoretical part of the discussion in this paper is concerned, there should be considered an important recent paper by Heizer (1958). He presents the point of view that the more elaborate California complexes may be considered "Preformative" or "Formative" in the Willey-Phillips classification, and that they should not all be considered "Archaic" as is done here. Heizer raises a significant question here which highlights the inevitable difficulty of defining developmental "stages." Whether one calls the California cultures Archaic or Formative depends on whether the classification rests fundamentally on technological stage or whether more emphasis is placed on social features, population density, and nonmaterial elaboration of the culture. In this paper I have chosen the former emphasis, although the broader view presented by Heizer may well be more meaningful for interpreting cultural development. Both Heizer and I have arrived at the same essential conclusion, however: namely, that hunting-gathering cultures in a favored environment may reach equal or greater complexity than some agricultural communities. Heizer has expressed this conclusion by classifying some California cultures in the more complex "Formative" stage; I have done it by pointing to the diversity of cultures possible in an "Archaic" technology. The different points of view can be represented as in Figure 7.

UNIVERSITY OF CALIFORNIA
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Although every effort has been made to check each of these references, some have been beyond the resources at the editor's command. We believe that this list is reasonably accurate; its completeness is a responsibility of the contributors. The following abbreviations are used:

AA	*American Anthropologist*. Menasha.
AJS	*American Journal of Science*. New Haven.
AlMNH-MP	*Alabama Museum of Natural History, Museum Paper*. Geological Survey of Alabama. University.
Am Ant	*American Antiquity*. Menasha and Salt Lake City.
AMNH-AP	*American Museum of Natural History, Anthropological Papers*. New York.
Ar	*Archaeology*. Cambridge and Brattleboro.
ASC-B	*Bulletin of the Archeological Society of Connecticut*. New Haven.
ASNJ-B	*Archaeological Society of New Jersey Bulletin*. Trenton.
ASV-QB	*Quarterly Bulletin of the Archeological Society of Virginia*. Williamsburg.
BAE-B	*Bureau of American Ethnology, Bulletin* Washington.
Ec	*Ecology*. Lancaster and Durham.
EP	*El Palacio*. Santa Fe.
GSA-B	*Geological Society of America, Bulletin*. Baltimore.
MAIHF-INM	*Indian Notes and Monographs. Museum of the American Indian. Heye Foundation*. New York.
Mas	*Masterkey*. Los Angeles.
MAS-B	*Bulletin of the Massachusetts Archaeological Society*. Attleboro.
MoA	*Missouri Archaeologist*. Columbia.
MP	*Medallion Papers*. Globe.
NMC-B	*Bulletin of the National Museum of Canada*. Ottawa.
NSIS-T	*Transactions of the Nova Scotian Institute of Natural Sciences*. Halifax.
NYSAA-RT	*Researches and Transactions of the New York State Archaeological Association*. Rochester.
OAS-B	*Oklahoma Anthropological Society Bulletin*. Norman.
PA	*Pennsylvania Archaeologist*. Milton.
PM-P	*Papers of the Peabody Museum, Harvard University*. Cambridge.
RMAS-RR	*Research Records of the Rochester Museum of Arts and Sciences*. Rochester.
RSPF-P	*Papers of the Robert S. Peabody Foundation for Archaeology*. Andover.
S	*Science*. Washington.
SAA-M	*Memoirs of the Society for American Archaeology*. Menasha and Salt Lake City.
SJA	*Southwestern Journal of Anthropology*. Albuquerque.
SMC	*Smithsonian Miscellaneous Collections*. Washington.
SwM-P	*Southwest Museum Papers*. Los Angeles.
TA	*Tennessee Archaeologist*. Knoxville.
TAPS-B	*Bulletin of the Texas Archeological and Paleontological Society*. Lubbock.
TAS-B	*Bulletin of the Texas Archeological Society*. Austin.
UC-AR	*University of California Anthropological Records*. Berkeley.
UCAS-R	*Reports of the University of California Archeological Survey*. Berkeley.
UK-RA	*University of Kentucky Reports in Anthropology*. Lexington.
UU-AP	*Anthropological Papers, University of Utah*. Salt Lake City.

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GORDON CHILDE MEMORIAL FUND

A memorial fund is being established to honor Professor Gordon Childe. It is planned to either establish an annual memorial lecture or to provide grants for foreign travel, in either case helping to increase the communication of ideas between scholars throughout the world, which Childe did so much himself to promote during his lifetime.

Although our Society is not in a position to make a contribution directly to the Fund, it is hoped that many members and other readers of this journal will wish to make personal contributions. All donations should be sent to The Secretary, University of London Institute of Archaeology, 31-34 Gordon Square, London, W.C.1, England.

FACTS AND COMMENTS

PLEISTOCENE MAN AT SAN DIEGO: A REPLY

Miller and Johnson's review of *Pleistocene Man at San Diego* seriously misrepresents the work in question. It is not the principal contention of the book that man lived in the San Diego area in the last interglacial, and that the age of the last interglacial is 100,000 years ago. By focussing on this, a most incomplete view is given of the archaeological section of the book.

The principal archaeological theses of the book are that there is a Lower Paleolithic core tool culture level in America, that this culture is older than the paleo-Indian level, and in fact extends at least through the entire Wisconsin, and possibly extends to the opening of the last interglacial. That this was the major archaeological problem of the area was explicitly stated on pages 182-3 and elsewhere.

Miller's review of the geomorphology presents an adequate summary of what was attempted. There is considerable room for criticism of terrace work. While it is true that I took average figures for Zeuner's terrace heights, they are the figures in common use. Other reviewers are chiding me for my excessive caution in their use. Further, it is not true that terrace height is the only basis for correlation of terraces. The section that Miller did not understand on soil reddening with data reported from terraces in Africa, and elsewhere, tended to show that similar soil development marked similar terrace heights in parts of the world with similar climates.

There is complaint about lack of figures and maps and scales. There are almost 100 figures in the book. My 6-foot-long field map could not be published. Maps are present as end pieces. They have scales, and all figures and sections are plotted on them. There are limits to printing budgets. Contrary to the impression given by Miller, I do know that all the colluvial material over the beaches is not Pleistocene. The evidence is given in the book and it is clearly stated that some of the colluvium is Recent (for example pp. 21, 23).

It is stated that I have attempted to prove that there has been no faulting or warping in the San Diego area in the Pleistocene and that this is not in agreement with the evidence put forth by earlier workers. I made no such absolute claim. Evidence was presented for minor faulting in the Pleistocene, and for major faulting separating the lower "Pleistocene" terraces from the higher (above 200 feet), earlier terraces. That there was a break in soil types between these higher and the lower terraces was emphasized. Evidence was presented that certainly makes warping minor, if present. Emery's paper, cited by my reviewers, does not explain the alternation of cut and fill associated with climatic changes, while the eustatic theory used by me does. It is true that former workers have assumed the area to have been extremely active geologically during the Pleistocene, but the evidence that I presented shows that this is not true — a point that Miller apparently accepts: "Faulting during the Pleistocene apparently has been relatively minor." Such an admission does not fit the reviewers' conclusion that the book contributes little to the terrace problem at San Diego.

My reviewers state that my hypothesis that the ocean basins deepened during the Pleistocene is no more reasonable than several other alternatives, omitting the fact that I mentioned other alternatives. Since it was presented as an hypothesis, has been advanced by others, and was stated to be part of the unsolved problem of the worldwide phenomena of cyclic rise and fall of sea level in such a way that older terraces are higher, it is difficult to see why this incidental point merits this attention. The same applies to the criticism of Figure 2.

Admittedly the soils chapter is difficult because of the local terminology and the detail of the discussion. That the iron and clay horizons of well known soils should be considered as "primary constituents" of the deposits overlooks the fact that I stated in my book that I had the advantage of consultation in the field of a number of soils men, including R. L. Pendleton, one of the world's leading experts on *laterite* (iron accumulation soils).

Similarly for the suggestion on clay, with reference to Kelley and to Nikiforoff. Nikiforoff had suggested that some apparent profiles were geological deposits — a layer of clay overlain by sand. These profiles are now much better understood, and we can even show that they have *developed* within middens within the past 3000 to 5000 years. This evidence is presented in the book and Nikiforoff's ideas are discussed on page 151.

The statement: "Carter apparently *assumes* that the relationship between rainfall and depth of leaching of calcium carbonate in the Great Plains (Jenny and Leonard 1934) applies also to Southern California," (emphasis mine) misrepresents my work. I discussed limitations of such transfers of knowledge on pages 164-6, specifically discussing the role of climate and textural type. This is not assuming the point.

Further misrepresentation is found in the discussion on archaeology. My review of previous work is characterized as "brief and incomplete." I stated (p. 183, and again on p. 366) that my comparing the San Diego material with the work of archaeologists working elsewhere in California had in a previous instance evoked an hysterical reaction and name calling. Therefore, the review of material in this case would be limited to the San Diego area. *All* work on the San Diego area was reviewed. To omit the stated limitation when accusing me of omissions is either careless or dishonest.

To Johnson, who reviewed the archaeology section, there is little of interest except the Texas Street site. This distorts the book. Even here, evidence from other sites that bears on Texas Street is ignored: for example, skeletal material in a 25-foot beach at La Jolla, and metates in a 25-foot beach at Crown Point. Johnson found the archaeological site descriptions "an almost random mixture of unconnected sentences dealing with observations on weathering, soil profiles, terrace loca-

tions, and buried soils." This is the way they would seem to someone who had either not read the preceding sections on soils, terraces, and geology, or, having done so, failed utterly to understand them.

Misrepresentations abound. "Carter does not recognize the fact that no matter how crude a human industry may be, artifacts are produced in definable patterns." I not only recognize this, but the whole archaeological section deals with patterns of stone work: compare 346, 366-73. The review of the evidence for hearths ignores my discussion, which includes size (p. 317) and plan (318, 319). The impression is given that I did not recognize the problem of natural fire but simply assumed that fire meant man. This is utterly contrary to fact. Typical hearths in unquestioned sites were described with specific reference to the general problem (compare Carlsbad, Bird Rock, and so forth).

Finally I am accused of cynically ignoring archaeological methods in dealing with the association of bone, marine shell, and fire. This ignores the fact that I was not only concerned with how such things were brought together, but was so cautious that I have played down the presence of whale bone in the hearths, due to their possible derivation from up-slope geological strata.

The comment on dating the Texas Street site is a further example of my reviewers' failure to carry over knowledge from one section to another. In the context of the book it is complete and clear. The presence of a sequence of valley fills separated by excavation and refills, is clearly recognized by all students of the area. The aerial photo of the site provided in the book should be sufficient to enable any geomorphologist to recognize a river terrace. The nature of the terrace deposit is clear; the age is more difficult — but the age of the deposit is also the age of the enclosed artifacts.

In the concluding paragraphs the reviewers return to my omission of papers by others. As explained above this was done deliberately, but no work on the San Diego area was omitted. I did not pass over the Haury-Rogers revision of the Southern California cultural sequences that appeared in *Ventana Cave*. This was discussed by letter with Haury at the time that *Ventana Cave* was published. Haury stated that Rogers was to have published a separate paper explaining the alteration of the previous sequences. Since this was never done, Haury was unable to explain just how the old terms were to be equated with the new alignment. Only two things were clear: Rogers had abandoned his 3000 to 4000 year chronology, and he and Haury had equated the well known San Dieguito culture with the basal strata at Ventana Cave. This I stressed (pp. 179-81).

My correlation chart is obviously based on interpretations. *All* Pleistocene dating is filled with interpretations and these are now being tested. Inasmuch as a major European laboratory now reports radiocarbon dates at about 60,000 years ago, and states that these have not reached the beginning of the last glaciation, their Würm, our Wisconsin, and inasmuch as similar results were reported at the American Geophysical Union meetings last May (beginning of the last interglacial 150,000 years ago and end at 70,000 years ago), I am content to stand by my interpretation of 60,000 to 80,000 years for the last glaciation as opposed to a 25,000 year Wisconsin.

My reviewers fail to see why I used Nelson's granite weathering ratio. The feeling grows upon me that the reviewers did not read the whole book carefully. Granite weathering is discussed for local terraces *and* archaeology *and* related to Blackwelders' work in the Sierra Nevadas *and* thence to Nelson's careful work in Colorado. All of this is indexed: 19 entries! Nelson's work, from a number of indices of weathering, gave a 60,000 year Wisconsin, and supplied subdivisions within Wisconsin time. That this is useful, and applicable to the San Diego area, and elsewhere, should have been apparent to any careful reader of the book.

In evaluating what this book accomplishes one needs to have some background in the area. The archaeologists whose work Johnson wanted me to discuss have insisted that there was no evidence of man in California prior to about 4000 years ago, and that the core and metate culture was of about that age. I have insisted that the La Jolla culture (plano convex core tools and metate) was at least ten times that age. Omitting the Texas Street site, a cultural sequence reaching through much if not all of the last glaciation is being verified (Arnold 1957; Simpson 1958; Orr 1956; Carter 1958).

It may surprise Johnson to learn that I am not wedded to the Texas Street site. In 25 years of work in Southern California, this is the only association of fire-shell-bone-stone of this type that I have seen. *If* it is evidence for man, others will be found. If other sites are not found, it probably is not evidence for man. For the past 20 years there has been little support for my conclusions for high antiquity for the La Jolla culture and for a prior core culture that lacked the metate. The work of Arnold and Simpson now tends to support it. So let it be with Texas Street. Time and work are needed.

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GEORGE F. CARTER
Johns Hopkins University
Baltimore, Md.
September, 1958

SIMILARITY IN THE SKULL OF THE BISON AND BRAHMAN

For a trained mammalogist or paleontologist, with a large reference collection and a library at hand, misidentification of bovine skulls (or partial skulls) is not a common occurrence. However, archaeologists identifying incomplete skulls and basing their identifications on the few available osteological keys, are cautioned of possible error where Brahman cattle are concerned. The Brahman (*Bos indicus*) was introduced in South Carolina in 1849 and is therefore a comparative newcomer to North America. However, enough Brahman remains lie buried throughout the southern United States to cause concern in areas where they might be mistaken for *Bison*.

The writer has observed deep brown staining of the bone in Brahman skeletons which were buried in the swampier prairies of the peninsular part of Florida during the last two decades. This dark coloration might lead to a mistaken identity and age, if only a superficial comparison of the bone were undertaken and if only those portions of the skull which are very similar to the bison were preserved. It is common practice to bulldoze a deceased cow into a gully and cover it with several feet of overburden so that a mistaken age based on the depth of the covering and the close resemblance of the Brahman to the bison might be adjudged to a comparatively recent burial. Regardless of the method or means of interment, the possibility of misidentification of Brahman material, with emphasis on partial skulls, is greater than is generally realized.

In recent years several splendid keys, to be used for the identification of Recent and Pleistocene mammals, have been published and widely distributed among archaeologists and mammalogists (Burt 1948; Glass 1951; Brown 1952; Cornwall 1957). Using only these keys, when actual comparative material is not available, is a hazardous practice where bison-Brahman material is concerned. The following statement from a section on the comparison of *Bison* and *Bos* (Hereford, Jersey, and so forth) is offered as a key characteristic for bison as compared to the domestic cow: "Frontals expanded laterally behind orbits so that zygomata are not visible from above" (Glass 1951: 45, Fig. 99). This statement generally holds true in domestic cattle, other than the Brahman, but is not a reliable criterion when the Brahman is compared with the bison as the zygomatic arch is obscured by the frontals in the Brahman as well as the bison (Fig. 1 *a, c*). This condition has also been observed in the case of several large Hereford bulls.

It may be well to point out an error in Glass' discussion of the *Bison-Bos* characteristics. His statement (Glass 1951: 45, par. 10), "premaxillaries not in contact with nasals — *Bos*," should read *Bison* in place of *Bos* and vice versa in the preceding paragraph. This same feature is correctly listed in a subsequent key (Brown 1952: 60-1, par. 6a, b, taken from Burt 1948: 69), but is subject to the same possibility of error as in Glass' key.

The joining of the premaxillaries with the nasals is generally a good means of distinguishing *Bos* from *Bison*, but here again there are exceptions in both genera where the nasals and premaxillaries meet at a common point with the maxillaries and if the nasals are weathered away and completely missing, this key is of little value. The skulls of bison and *Bos taurus* are not difficult to distinguish when seen from a lateral view, due to the decided angle formed at the frontal eminence in the latter. When this same area in the Brahman is compared with that of the bison and *Bos taurus*, the outline more nearly approaches that of the bison (Fig. 1 *b, d*). The supraorbital foramina which are located in a deep supraorbital groove in the bison and the Brahman are not as noticeably recessed in the specimens of *Bos taurus* examined.

If the entire skull is preserved identification is simplified, as the general outline of the dorsal surface of the skull in the bison more nearly approaches an equilateral triangle whereas this same area is longer and narrower in the Brahman and other members of the genus *Bos*, having the general form of an isosceles triangle (Fig. 1 *a, c, e*). The occipital region, viewed dorsally, exhibits a dished or nearly straight line between the horn cores in the Brahman as compared with an outwardly curved margin in the bison (Fig. 1 *a, c*). The horn cores alone in the bison and the Brahman are nearly identical in curve, shape, sculpturing, and stoutness, whereas the horn cores in other species of domestic cows tend to be lighter in build when compared with those of the bison. This similarity in bison and Brahman horn cores is particularly confusing when only that portion of the brain case exhibiting the horn cores is preserved. The orbits of the bison project laterally to a greater degree than those found in the Brahman and other domestic cows. The elongated neural spines or "hump ribs" of the thoracic vertebrae of the bison were long used to determine if the skeletons were *Bison* or *Bos* (Burt 1948: 265). These same vertebrae in the Brahman have the elongated spines in the region of the hump and are therefore of little value for distinguishing bison from Brahman.

This brief contribution is intended only as a cautionary note for field workers, but it is hoped that a more thorough study can be undertaken on the dentition and postcranial skeletons of these two similar forms.

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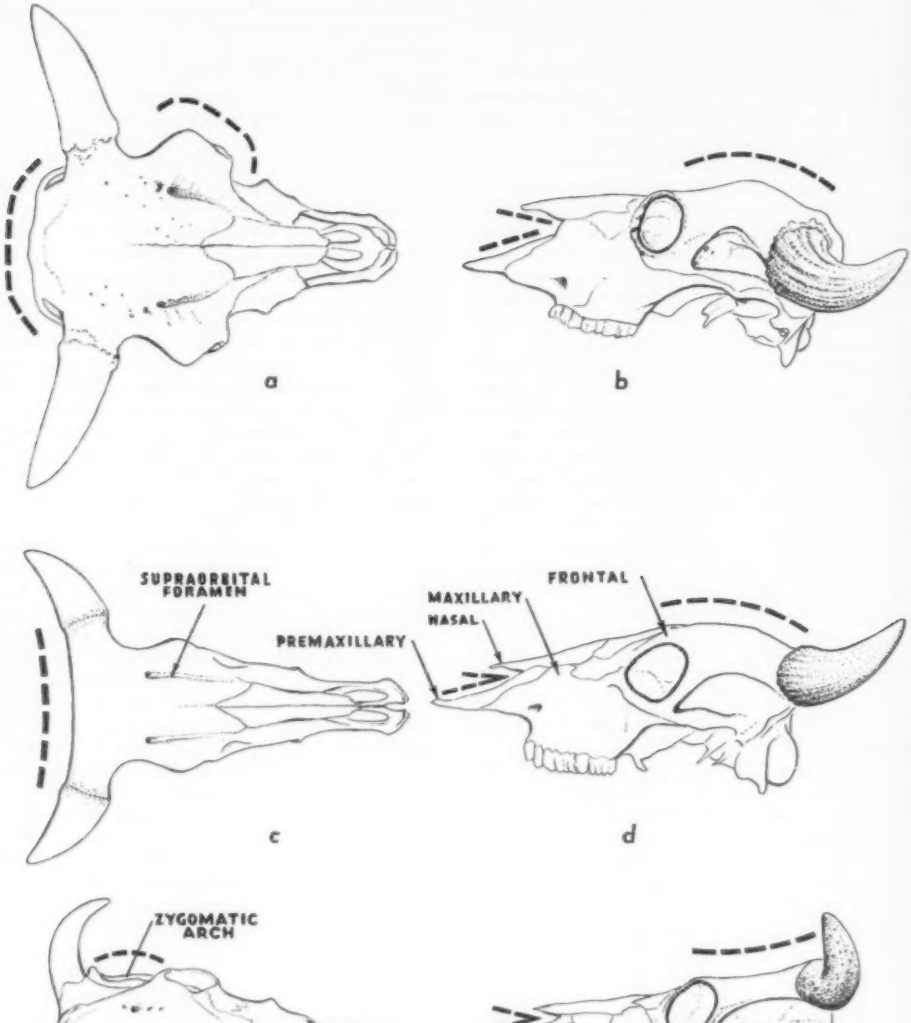

FIG. 1. [Olsen]. Comparison of the skulls of North American buffalo, Brahman, and domestic cow. *a*, dorsal view, *b*, lateral view of the skull of the North American buffalo, *Bison bison*; *c*, dorsal view, *d*, lateral view of the skull of the Brahman, *Bos indicus*; *e*, dorsal view, *f*, lateral view of the skull of the domestic cow (other than Brahman), *Bos taurus*. Dashed lines indicate differentiating characters.

BIBLIOGRAPHY OF PRIMARY SOURCES FOR RADIOCARBON DATES[1]

A chronology program was launched in December, 1957, by the Missouri Basin Project of the Smithsonian Institution for the purpose of testing culture sequences in the Central and Northern Plains and contiguous regions. The Missouri Basin Chronology Program envisages (a) assembling all relevant chronological data in hand and (b) selecting materials for analysis by the various dating methods. The Missouri Basin Project acts as coordinator of the program; it has received enthusiastic response and is now cooperating with a dozen institutions in the area engaged in archaeological research. This bibliography of *primary* sources for radiocarbon dates, prepared in connection with the Missouri Basin Chronology Program, is offered here for the benefit of cooperators in the program and archaeologists generally. It supplements the valuable bibliographies of radiocarbon dates published by Hilde Levi (1955, *Quaternaria*, Vol. 2, pp. 257-63) and by James B. Griffin (1957, *Bulletin of the American Anthropological Association*, Vol. 5, No. 2, p. 1). It does not include the many secondary assemblages and evaluations of radiocarbon dates and radiocarbon dating which should be consulted by the interested student. Frederick Johnson, R. H. Thompson, and Dick Shutler, Jr., read earlier versions of this bibliography and graciously supplied several references.

The following list of radiocarbon laboratories, which is arranged alphabetically according to the prefix used by each laboratory to identify its samples, serves to cross-reference the bibliography. The references for each laboratory are given in the order of their publication. The titles in the bibliography are listed by author and date; an asterisk after a date indicates that no sample prefix is used in that publication.

A — University of Arizona, Carbon-14 Age Determination Laboratory: Wise and Shutler 1958.

C — University of Chicago, Institute for Nuclear Studies: Arnold and Libby 1950, 1951; Libby 1951, 1952, 1954a, 1954b.

[CT] — California Institute of Technology: This laboratory has never published a list of dates; two dates are given by Orr 1956. Radiocarbon dates are no longer produced at this laboratory.

GL — University of London, Geochronological Laboratory: Zeuner 1955, 1956.

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M — University of Michigan, Michigan Memorial-Phoenix Project: Crane 1956; Crane and Griffin 1958a, 1958b.

[Ma] — University of Manitoba: Pringle, Turchinetz, Funt, and Danyluk 1957. This laboratory is listed under *Ma*, despite the fact that the published sample prefix is *S*, in order to avoid confusion with the University of Saskatchewan laboratory which first used *S* as a prefix. Radiocarbon dates are no longer produced at this laboratory.

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CHARLES H. MCNUTT
RICHARD P. WHEELER
Missouri Basin Project
Lincoln, Neb.
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REVIEWS

Edited by Donald Collier

The Jomon Pottery of Japan. J. Edward Kidder, Jr. Artibus Asiae, Supplementum 17, Ascona (Switzerland), 1957. xvi+200 pp., 45 figs., 7 pls., 6 maps. $12.75.

This comprehensive, well-organized study outdates all previous Western-language works on Japanese preagricultural ceramics. The author is acquainted with up-to-date Japanese opinion and respects it. Yet, his approach is constructive and imaginative on its own. He brings out features that are well enough known but seldom explicitly stated even in Japanese works. The book is well thought out and well designed for reference, with maps locating each site, full index, bibliography, and almost 1100 drawings of vessels representing the various style ranges. It should be within reach of every American likely to have reason to look for Asian relationships of American materials, and its excellent typography adds to the pleasure of reading it for its own sake.

Even so, this study does not make light reading. Japan's Jomon pottery, best explored of all the families of wares that accompanied hunting and gathering cultures throughout north Asia, prevailed without competition for perhaps more than three and a half millennia before 250 B.C., and lasted in the isolated north of Japan as late as the 10th century of the Christian era. In this long span of time there occurred much regional variation. The analysis of Japanese archaeologists tends, on the one hand, to stress local distinctiveness by applying a new type name to each newly discovered variant so that named types multiply with a fecundity equal to that of the children of Abraham in the book of Genesis. As antidote, this analytic approach is followed up by a form of synthesis which pigeonholes types in an over-all scheme of six stages of development, first enunciated by Yamanouchi on the basis of sites in the Kanto area around Tokyo, where exploration was most intensive. Kidder does not subscribe to the concept of development by stages. He has discovered, for example, that only central and northern Japan ever made much of applied fillets and plastic decor that constitute the distinctive core of the Middle Jomon "stage," whereas western Japan was virtually untouched by this "stage." So he attempts, instead, to trace specific ornamental techniques that spread and became common to a number of types, and to group wares into families on the basis of these key techniques. Some families that result are localized, whereas others are very widespread. But he does not oversimplify or ignore the great variety of types specified by Japanese workers, so the reader still has the task of retaining a great many unfamiliar names or of visualizing solely from his written description a large number of complexly ornamented wares.

The book's plan is regional. Kidder deals with problems of chronological sequence in a region in successive chapters that describe the potteries of each region. His concluding chapter points up interregional homologies and presents an over-all view of the ceramic history of Jomon cultures. A final table summarizes interregional correspondences, stressing shared techniques rather than types as such. The book is not a study of all Jomon culture; no more than occasional and rather casual comment is made on dwellings, burials, or artifactual materials other than pots and clay figurines, and just enough attention is paid to ecology to justify the regional divisions and subdivisions. Nevertheless, taking the ceramic part for the whole, it is not far wrong to characterize this work as a study of the crystallization of local cultures and of their historical interrelations, for pottery, as usual, is the most sensitive single indicator of development and contact.

Japan's earliest ceramic wares, Kidder suggests, are unlikely to have a single point of origin. Roller-stamping entered or developed in the southwest, wrapped-string impressions in the Tokyo area, and shell impressions and incising in the north, the last perhaps being not quite as old as wrapped-string impressions. In central and northern Japan there then appeared plastic, applied fillets and other ornament which never subsequently was completely abandoned. It was much subdued for a time, however, by zoned cord impression which looks like a dialect variation of the Hopewell ornamental idiom and which, in Horinouchi, Kasori B, and related types, affected virtually every locality of Japan. By late Jomon time, carving and incising were applied to smooth surfaces in the north, whereas a new sort of cord-texturing was featured in the west. The western wares were replaced rather abruptly after 250 B.C. by wheel-turned Yayoi pottery, associated with agricultural mode of life, whereas late Jomon persisted until the 4th century A.D. north of the Kanto district and up to the 10th century A.D. on the northwest fringe of Hokkaido. Its vivacity in the far north is emphasized not only by decorative borrowings from lacquer and metal designs used, presumably, by technologically richer neighbors on the south in the later centuries, but also by pot-making innovations such as the special sort of string impressions characterizing the Okhotsk pottery styles in northwest Hokkaido.

For all that this thoughtful, large-scale study merits much credit, a few words of caution or criticism here will guide those who skim it for general impressions or keep it at hand for reference. Two sorts of maps are given, one of sites grouped in modern prefectural boundaries, the other of provinces. A strain of antiquarianism impels Japanese to use defunct province names repeatedly, so the last-named map is needed, but it should be made clear that the provinces were superseded about 1880 by the modern prefectural administrative units. More confusing, perhaps, is the arrangement of tables; most of the chronological sequence lists are arranged historian-fashion, beginning at the top with the earliest types; but a few show the earliest types at the bottom, in the sequence presented by excavation. Unfamiliar and nonstandard descriptive terms are frequent; Kidder's

training has been in art history more than American dirt archaeology, so his vocabulary, though often refreshing and usually precise, does include variants such as "roulette" for a roller-stamp impression, or "gravel" for grit temper. Finally, though one must be grateful for the labor that went into the many small drawings of pot shapes and decor, the person interested in detailed comparison often will find insufficient guidance; the figures are too small to show decorative detail and the photographic plates tend to be chosen to illustrate unusual rather than typical features. For photographic reference, thus, there still is use for Gerhardt Groot's *Prehistory of Japan*, which contains (without credit) many excellent photographs and identifications made by Professor Sugao Yamanouchi. By far the most trustworthy as well as the most complete reference work for almost every purpose, however, is the newer study, Kidder's *Jomon Pottery of Japan*.

RICHARD K. BEARDSLEY
University of Michigan
Ann Arbor, Mich.

A Manual for Neanderthals. H. MEWHINNEY. University of Texas Press, Austin, 1957. 122 pp., illus. $3.50.

This book is an excellent introduction to the difficult and almost lost art of flint working. Its greatest virtue is readability and clarity of presentation. It is divided into sections dealing with flint technology, functional typology, and Stone Age history. The section dealing with flint technology constitutes the most successful part of this study. The author's remarks on the nature of flint, the workability of the material, and the techniques that have presumably been used by ancient man to manufacture flint tools are informative and well worth reading. They should prove quite profitable to students and specialists of the Stone Age.

The author is on much less safe ground in his outline of Stone Age history. Of course, within the limits of this book this discussion is necessarily somewhat sketchy, but even so exception has to be taken to a number of wrong or misleading statements. Discussing the core tool traditions of Asia the author states that "in eastern and southeastern Asia and in a small part of India most of the core tools were big, clumsy choppers" (p. 13). This is, as far as India is concerned, incorrect, since the typical Southeast Asian core tools are found throughout the Indian subcontinent in great abundance. Subsequently, by stating that "in Burma some of the choppers were made from squarish blocks of petrified wood rather than flint" (p. 13) the author seems to imply that flint was used elsewhere in Asia. This is not correct. In fact, flint was hardly used at all; quartzite and tuff are the standard raw materials here. Elsewhere the Clactonian industry of England is described as consisting of "thin and rather well made flakes" (p. 15); in point of fact the hallmark of the Clactonian is thick, heavy, ill-controlled and clumsy flaking. Again, why Levallois flakes "seem to be the handiwork of man who had been thoroughly and even excessively indoctrinated in fist-ax theory" (p. 16) is quite incomprehensible to this reviewer.

Finally, in his discussion of the seemingly advanced Aterian tanged points of North Africa, Mewhinney suggests that Neanderthal men were responsible for this industry, and he adds that "apparently they did this at a time when presumably more intelligent people of modern physical type had already taken over France dispossessing whatever Neanderthals had been there, but were still contenting themselves with spear points of bone" (p. 18). Apart from the fact that there is nothing to suggest that Neanderthals were the makers of the Aterian complex, the implied notion that the quality and type of tools can serve as indices of intelligence cannot be accepted. It is questionable whether about 35,000 or 40,000 years ago "men of modern type invaded western Europe and introduced the crafts and skills known as Upper Palaeolithic" (p. 18). There is considerable evidence that sapiens-like forms have been in Europe for a much longer period of time; whether the appearance of Upper Palaeolithic industries can be linked exclusively to Homo sapiens is also disputable. Discussing tool types in terms of function the author at times is treading on thin ice. The statement that fist axes serve for chopping (p. 78) is sheer guesswork without a shred of evidence to support it.

So much for adverse criticism. In conclusion it can be said that the author's discussion of flint technology will prove very useful to all Stone Age archaeologists. His remarks on the nature and quality of flint present in concise form much interesting and illuminating material. On the other hand the culture-historical and typological sections should be taken with a grain of salt; they contain many misleading and doubtful statements.

OLAF PRUFER
Harvard University
Cambridge, Mass.

Man the Tool-Maker. KENNETH P. OAKLEY. University of Chicago Press, Chicago, 1957. 148 pp., illus. $1.25.

The book reviewed here is the American edition of Oakley's excellent British Museum handbook bearing the same title. Though this is not expressly stated, the American edition is merely a reprint of the third English edition published in 1956. Little need be added to what has been said in earlier reviews about Oakley's exemplary and thoughful introduction to Stone Age history and technology. The author subdivides his material into nine sections dealing with the antiquity of man, the origins of tool making, the question of raw materials, technology, Stone Age history, evolution of Palaeolithic culture, implements associated with fossil man, and considerations of some of the attributes of man the tool-maker. Furthermore, the book is well illustrated; it is provided with a useful glossary and a table outlining the cultural traditions of the Palaeolithic in space and time.

The number of editions which this book has had in England is a good index to its usefulness and popularity.

It is indispensable to the beginner in the study of Stone Age prehistory, and it should prove in the future — as it has done in the past — a most readable and informative textbook for introductory courses in anthropology. From the point of view of American readers it is perhaps a little disappointing that the rich and varied tool-making traditions of the New World have been dealt with on less than one page.

The standard of publication, by comparison with the English editions, is not entirely satisfactory. The photographs reproduce poorly on the paper used. On the whole, however, the American edition of this invaluable book is a most welcome addition to the steadily increasing number of low-priced publications in anthropology and archaeology.

OLAF PRUFER
Harvard University
Cambridge, Mass.

Late Pleistocene Geochronology and the Paleo-Indian Penetration into the Lower Michigan Peninsula. RONALD J. MASON. University of Michigan Museum of Anthropology, Anthropological Papers, No. 11, Ann Arbor, 1958. 48 pp., 3 figs., 9 pls., 5 maps.

This is a fine report based upon a study of 115 fluted points from the lower peninsula of Michigan. There is a good summary of distributional data followed by an outstanding technical description and analysis of the fluted points. After a review of geochronology there are presented suggested correlations of fluted blade loci and late Pleistocene events. From this Mason suggests an antiquity for the Michigan fluted blades beginning about 13,500 years ago and ending, at the latest, by 8,500 years ago. This conclusion is in essential agreement with that reached by the reviewer in an independent study of fluted points and geochronology in the Lake Michigan basin. There are, however, some differences of opinion concerning some details of geochronology and paleogeography.

For instance, I would not yet tie the Port Huron ice advance to the Mankato concept because, no matter what else one calls it, until an interstadial is found to precede the Port Huron advance, it must be considered an oscillation most closely related to the Cary retreat.

On correlations between the Huron and Michigan basins in pre-Lake Algonquin times I would bet on Hough's interpretations instead of those of Leverett and Taylor, especially since Leverett and Taylor were incorrect in their interpretations of Algonquin and post-Algonquin events. This difference of opinion on basin correlation is the only serious one; its effect is to produce quite different concepts of the geography of the eastern half of Michigan in the stages between Port Huron and Lake Algonquin.

Mason has an excellent comparative section. In his summary and conclusions he reiterates an important result of his study, namely that the antiquity of the eastern paleo-Indian period, at least as expressed in the Upper Great Lakes area, is equal to that of the Plains and Southwest. I agree with this conclusion.

GEORGE I. QUIMBY
Chicago Natural History Museum
Chicago, Ill.

Sun Circles and Human Hands. The Southeastern Indians: Art and Industry. Edited by EMMA LILA FUNDABURK AND MARY DOUGLASS FOREMAN. Emma Lila Fundaburk, Publisher, Luverne (Alabama), 1957. 232 pp., 160 pls. $7.50.

The editors, nonprofessionals in the field of anthropology, have assembled material that gives an impressive visual record of the prehistoric and historic Indian cultures of the Southeastern United States. Illustrations are lavish — some 1700 individual specimens are reproduced, plus drawings of art motifs, manufacturing techniques, and Indian life as observed in colonial times. The standards of reproduction, moreover, are gratifyingly high. The text consists largely of extensive quotations from publications by professional workers in the Southeast. These relate to such topics as the use of raw materials by the historic Indians, trade, Cushing's Key Marco excavations, and the symbolism of the Southern Cult (the book derives its name from two prominent cult motifs). A frame of reference is provided by a short introductory summary of culture periods in the Southeast.

A wealth of detailed data appears in the captions, but in general there is a lack of synthesis. The illustrated artifacts tend to stand as individual specimens arranged according to class (projectile points, stone ornaments, and so forth) rather than as representatives of particular types or cultural units. Nevertheless the data, visual and descriptive, are present from which to obtain an excellent idea of the major traditions in material culture, especially during the Mississippian period. The value of the book to the amateur and the general reader is evident to anyone who scans its pages. The work represents a handy compilation of outstanding art and artifacts, previously published and unpublished, and as such is a useful addition to the specialist's library.

ROBERT L. RANDS
University of Mississippi
University, Miss.

An Archaeological Survey of the Fremont Area. JAMES H. GUNNERSON. University of Utah Anthropological Papers, No. 28, Salt Lake City, 1957. vi+154 pp., 30 figs., 6 tables. $3.00.

Two Fremont Sites and Their Position in Southwestern Prehistory. DEE C. TAYLOR. Appendices by Noel Morss and W. H. Burt. University of Utah Anthropological Papers, No. 29, xi+184 pp., 57 figs., 15 tables. $3.50.

These companion monographs provide a very satisfactory archaeological record of the Fremont culture in Utah. Previous investigations of Fremont sites, including early and obscure sources as well as those more recent and better documented, are systematically summarized and fairly evaluated. With their addition of new data, the authors establish the Fremont area as a valid cultural entity between the Rocky Mountains in the east and the Great Basin in the west.

Gunnerson describes a survey of the geographic range of the Fremont culture east of the Sevier River. The results of the survey are first presented in the form of an inventory and description of dwellings, artifacts, and other archaeological features observed or collected. In the second part of the monograph, more than 200 individual sites are recorded, with description of observable features, location, and environmental setting. The sites include house clusters or villages, caves and rock shelters, masonry "forts," campsites, and pictograph panels. Test excavations were made in house floors at four surface sites along the headwater valleys of the Muddy River, a northern tributary of the Fremont (Dirty Devil) River.

Gunnerson's well-illustrated description of Fremont pottery is a welcome addition to the literature. Both in content and organization, his monograph is very satisfactory for the purpose intended. However, the location map is inadequate and unattractive. The reader is obliged to rummage elsewhere for location of rivers, creeks, canyons, and other topographic information relevant to the text. In contrast to this, the location map in Taylor's paper is excellent.

Taylor describes the excavation of Old Woman ruin and Poplar Knob ruin, two village sites in Ivie Creek Valley, a tributary of the Muddy River at the foot of the eastern escarpment of the Wasatch Mountains in Sevier County, Utah. The elevation of the Old Woman site is 7250 feet, and of the Poplar Knob site, 6450. Scattered groves of juniper, pinyon pine, and oak brush grow on the adjacent slopes of the valley floor. The climate is semiarid and the environment is typical of the Colorado Plateau Province.

The houses exhibit considerable variety of form and materials. Both round and rectangular houses occurred at the Old Woman site, with floors about 18 inches below the surface. At Poplar Knob, the rooms were rectangular with floors at ground level. Walls were constructed of stone masonry, mud-loaf masonry, and jacal (mud plastered on a palisade of poles). Most of the floors were saucer-shaped, rising at the margins to fuse with the mud-plastered walls. For clarity of exposition, the isometric plan and profile (Fig. 16) of the Old Woman site merits special praise.

On the evidence of pottery and other artifacts, Taylor concludes that the two sites, 3.5 miles apart, were contemporaneous. Pueblo trade pottery provides an estimate of age: occupation some time during the 12th century and abandonment about A.D. 1200. Both sites, therefore, have been assigned to the terminal period of Fremont occupation.

The figurines found at Old Woman site (Morss, Appendix I) offer convincing evidence that these represent the Fremont culture. The virtual identity of these figurines with the Pillings figurines from the Range Creek drainage, 80 airline miles northeast (not northwesterly, p. 169), as well as distinctive pictographs and other traits, indicate continuing contact between village groups within the Fremont area.

The faunal remains (Burt, Appendix II) indicate that rodents, as well as rabbits and larger game, were cooked and eaten. Fish bones were absent. The comparative prevalence of mountain sheep and scarcity of deer bones, here as in some other Utah and Nevada sites, deserve further study.

Taylor concludes his paper with a well-reasoned review of the Fremont culture in relation to the prehistory of the Greater Southwest. His brief for an autochthonous Formative Fremont culture stage derived from a prepottery Desert culture is supported by a considerable body of data collected and published in the last 20 years, and particularly by the archaeological investigations of the University of Utah during the past decade.

Taylor's modification of terminology for Utah archaeology seems to me to be moderate and constructive. It has become apparent that the term Northern Periphery is obsolescent. In Table 15 Taylor postulates a Formative Fremont culture and a native population, with Basketmaker and Pueblo contacts from about A.D. 500 to 900. Out of this culture stage two geographical variants of the Fremont culture developed: Plateau Fremont east of the Wasatch Mountains and Sevier Fremont in the west. These groups maintained contact with Pueblo people further south from A.D. 900 to about 1200. Taylor's reconstruction accommodates the present archaeological record and represents, in fact, the consensus of himself and other archaeologists actively engaged in Utah archaeology.

In the matter of terminology, however, the reader may be confused (as I am) by Taylor's differentiation between San Juan Anasazi and Western Pueblo, which are represented in Table 15 as two independent sources of Pueblo influence on the Fremont culture. In terms of Reed's Western Pueblo (1950, *Southwestern Journal of Anthropology*, Vol. 6, p. 120), Taylor's reference is puzzling, because Reed postulates a northern penetration of Western Pueblo no earlier than A.D. 1300, a century after the Fremont region was abandoned.

Taylor exercises commendable restraint in discussing the subsequent fortunes of the Fremont people after their loss of identity about A.D. 1200. His conclusions may tantalize a few readers who prefer a happy ending, or better still, wholesale extermination by massacre or plague. Nevertheless, the archaeological record yields no positive clue as to the language or tribal identity of the Fremont culture.

ROBERT F. BURGH
Peabody Museum West of the Pecos
Tucson, Ariz.

Contemporary Pottery Techniques in Southern and Central Mexico. GEORGE M. FOSTER. Middle American Research Institute, Tulane University, Publication 22, New Orleans. 48 pp., 12 figs., 1 map. $2.00.

This publication is an elaboration with supporting technical and distributional data of Foster's earlier article on the implications of modern Mexican mold-made pottery (*Southwestern Journal of Anthropology*, Vol. 4, pp. 356-70, 1948). It is based on his observations at many of the principal pottery-making centers of central and southern Mexico and utilizes all of the available published data. As the author points out, the survey is not complete, but it is the first and a very fruitful attempt to synthesize and to subject to comparative analysis the varied data on contemporary Mexican pottery making.

Chapter 1 is a summary of pottery techniques used in Mexico today. The techniques of forming vessels include hand modeling from a lump of clay; building (including coiling); molding with convex "mushroom" molds (may be combined with hand modeling, coiling, use of paddle, or the potter's wheel); molding with concave molds producing horizontal welds; molding with concave "vertical halves" molds; modeling with the use of a revolving base (*molde*); and wheel-throwing. Of particular archaeological interest is the discussion of the evidence to be found on mold-made pots that permits inferences as to how particular vessels were made. There are brief sections on clays and tempers, finish, and firing.

Chapter 2 gives a state-by-state discussion of pottery-making centers, with data on clays, manufacturing techniques, form and decoration of pots, sex of potters, and marketing practices. There is great variation in the amount of information available on each of the 142 pottery-making towns covered.

Chapter 3 summarizes the distributional data and draws historical conclusions from them. Foster sees the present bewildering variety and distribution of techniques as resulting from the meeting of two pottery traditions, the Mesoamerican and the Spanish. Pure Indian and Spanish technologies survive in Mexico today, but in most regions varying degrees of blending have occurred to bring about recognizable distributional areas characterized by clusters of traits. Foster believes that the following pottery traits in south-central Mexico are of Indian origin: female potters (but note that often Yucatecan Maya potters were men), hand modeling and building, wooden paddle, revolving base (*molde*), mushroom molds, stamps, and open firing. Of Spanish origin are male potters, puddling of clay, potter's wheel, vertical-halves concave mold, glazing, kiln firing, and the system of naming shapes and sizes of pots.

Of particular importance is the question of the origin in Mexico of concave piece-molds. Foster presents convincing distributional and associational evidence indicating that the vertical-halves concave mold in use today in Michoacán is of Spanish origin. The lack of known pre-Columbian examples of such molds and of inferential evidence of their ancient use leads him to conclude that they were rarely or never employed in preconquest Mexico. He thus takes a more negative position than he did in his previous article referred to at the beginning of this review, where he mentioned the existence of Early Classic vessels (thin orange ware) from Puebla made in two-piece concave molds, and threw the whole matter open for investigation. He now seems to allow his conclusion that the modern piece-molds of Michoacán are of Spanish origin to overshadow his previous important hypothesis concerning pre-Cortesian piece-molds. The matter should not be allowed to rest thus in view of the importance of the two-piece concave mold in ancient Peru, its presence in Guatemala during the Classic period, and the wide use in Mexico from Classic times onward of molds for making figurines and pottery stamps. The factors that make molds so rare in Peruvian collections could apply equally to Mexico, and a great deal more work has to be done on the technology of pre-Columbian Mexican pottery before this negative conclusion can be accepted.

Another matter of interest is the use of the paddle (and anvil?) in western Mexico, where it is associated with the mushroom mold and the inverted-pot mold, which Foster considers to be a variation of the mushroom mold. A more intensive investigation is needed of the contemporary use of these techniques in Jalisco and neighboring areas, and evidence of them should be sought in archaeological pottery. Until more information is available it will not be feasible to assess the possible historical relationships between these western Mexican techniques and the paddling techniques of the Southwest and the eastern United States on the one hand, and the paddle-and-anvil and stamping tradition (associated with inverted-pot molds) of the far North Coast of Peru on the other.

The importance of Foster's study both for Mexican ethnology and as the foundation for future attempts at archaeological inference cannot be exaggerated. With this and Raymond Thompson's recently published monograph on Yucatecan Maya pottery making, a sound foundation has been laid for all future pottery studies in Mexico. It is to be hoped that they will stimulate a greater interest in ceramic technology among Mesoamerican archaeologists.

DONALD COLLIER
Chicago Natural History Museum
Chicago, Ill.

The Archaeology of Central and Southern Honduras. DORIS STONE. Papers of the Peabody Museum, Harvard University, Vol. 49, No. 3, Cambridge, 1957. xii+135 pp., color frontis., 84 figs. $5.85.

The Maya, Lenca, Pipil, Paya, and Matagalpa were just a few of the many Mesoamerican and South American groups that were living in Honduras in the early 16th century. Whether any or all of these peoples anciently occupied their historic locations or were recent arrivals is a central question; to answer it with the meager ethnographic and archaeological data on hand appears almost impossible.

Doris Stone throws some light on this problem in this publication, which is her second major work on Honduras (the first, published in 1941, deals with the archaeology of the North Coast). The report is organized in eight chapters, six of which are concerned with the separate areas of central and southern Honduras, one describes and reclassifies Comayagua pottery, and the last is reserved for general discussion and conclusions. Chapter 2 contains Lothrop's previously unpublished map of the famous fortress site of Tenampua.

Essentially this is a survey without time depth, for there is little reference to the excellent Honduranian chronologies established by Canby and by Strong, Kidder II, and Paul. If the 75 sites noted had not received such abbreviated description, the report would have greater value. In general, the data gleaned from mounds, pottery, and pictographs seem too slight to support her generalizations about buffer areas, ethno-archaeological linkages, and a Central American complex. Of primary importance, however, is the new material that comes from virtually unknown regions. The large mound groups and varied pottery that Stone describes indicate that Honduras is rich in significant problems.

JEREMIAH F. EPSTEIN
University of Texas
Austin, Tex.

Arqueología Chilena: Contribuciones al Estudio de la Región comprendida entre Arica y La Serena. RICHARD P. SCHAEDEL AND CARLOS MUNIZAGA A. Universidad de Chile, Centro de Estudios Antropológicos, Santiago, 1957. xiii+122 pp., 16 figs., 23 pls., 1 table, 6 charts.

Schaedel and some of his former students at the University of Chile have prepared a useful synthesis of the archaeology of the northern regions of this string bean country. It serves to bring the reader up to date on what has taken place in north Chile since the publication of the *Handbook* articles, introduces new and more consistent terminology and outlines some of the major research problems of the area. In the first 42 pages, authored by Schaedel, the findings of such early investigators as Latcham and Uhle are compared with the later researches of Junius Bird, Greta Mostny, and the *Centro de Estudios Antropológicos* of the University of Chile. To guide his discussion Schaedel follows a procedure adopted by the *Centro* for its field trips. He divides north Chile into ecological zones, summarizes the archaeology of each and tries to determine the amount of overlap between cultural and ecological areas. In the introduction he speaks of four field trips undertaken by the *Centro*, but so far as I was able to determine, he discusses principally the results of the first.

Treated in greatest detail are the river valleys of the extreme north, the north coast, and the Diaguita region. Students of the *Centro* did not visit the Atacama desert on their initial trip in 1953 and, consequently, this zone is discussed only briefly and without reference to personal experience. In an appendix Schaedel does propose a new system of terminology for the Atacameño sequence previously defined by Latcham. His purpose here is to make phase designations consistent with criteria adopted by the Society for Peruvian Archaeology during its 1953 meetings in Lima. Schaedel does not confine this overhauling job to the Atacama region, suggesting new or revised terminology for all the archaeological areas of north Chile.

Schaedel opines that the culture of the Lluta and Azapa valleys (inland from Arica) belongs to Bennett's Peruvian co-tradition. He would place the adjacent coastal zone (between Pisagua and Arica) in the same grouping despite ecological differences between coast and interior. Basing his judgment on site locations now abandoned, he postulates greater stream flow aboriginally than at present. At the site of Rosario-Peña Blanca he and his students discovered the ruins of a large village, laid out according to a definite plan. He attributes this village to the period of Inca domination. The Altiplano is viewed by Schaedel as the most important center of influence for the Arica region. He regards the Chincha valley of Peru as much less significant, if a factor at all. Uhle and Latcham have looked to the latter area for the origin of certain ceramic elements which they regard as important in late periods.

Between Pisagua and the Copiapó River Schaedel distinguishes two culture areas — one along the coast, the other inland. He lumps together the Pampa of Tamaugal and the Atacama desert to produce the latter. Sites without pottery have not been found inland and Schaedel agrees with Bird that coastal prepottery manifestations belong to a single cultural development. However, with the introduction of pottery regional variations take shape along the coast. Schaedel distinguishes three subdivisions of the maritime area during these later periods: the Pisagua-Patillo development, characterized by monochrome ware, an absence of permanent architecture and a predominance of maritime artifacts; the Tocopilla-Punta Guasilla manifestation, marked by similar pottery and artifacts, but notable for its permanent architecture; and the Paposo-Caldera development, characterized by strong agricultural influences from the north. Relying on the results of research by Cornely and Iribarren, Schaedel makes some interesting comparisons between cultures in the Diaguita area and other Andean regions. He points out similarities between El Molle and Condor Huasi in Argentina, Chiripá and Paracas in Peru, and the Parití tomb material from Bolivia. He also emphasizes the close ties between Diaguita and other cultures to the south.

The last chapter of this volume is devoted to a scholarly, detailed discussion by Carlos Munizaga of the Arica chronologies proposed by Bird and Uhle. In this encounter Uhle comes off second best although Munizaga also is critical of Bird on several counts. For example, he seems to feel that the latter has not been consistent with respect to his postulations concerning a preceramic agricultural period in north Chile. He maintains that Bird suggested this possibility in his original monograph, then

backed off from such a hypothesis in his *Handbook* summary without offering a satisfactory explanation for the change of heart. He cites quotations from Willey ("Ceramics" in Vol. 5 of the *Handbook*) and Steward ("South American Cultures," also Vol. 5) which present differing conclusions about this matter, both based on Bird.

Actually, Willey's statement ("there is *some* evidence to support the thesis that agriculture preceded ceramics by a relatively short time") is to my way of thinking a slightly stronger statement about the subject than Bird makes in either of his articles and probably reflects Willey's opinion (based on the original report) more than it does Bird's. Willey modifies this statement in *Method and Theory in American Archaeology* (p. 141): "In the Arica sequence there is some *slight* indication that maize may have preceded pottery, *but this is not certain*." Steward's comment ("with the introduction of agriculture came pottery, especially painted wares. . . .") is based, as the author states, on Figure 49 accompanying Bird's *Handbook* summary. As his reason for not listing a prepottery agricultural period in this figure Bird writes: "Grave finds had suggested an early agricultural stage with coiled basketry and weaving, but without pottery, paralleling the Basket Maker culture of the Southwestern United States; but data from middens failed to support this sequence."

Munizaga's contention is that Bird had this same midden information in his first report, yet still suggested the possibility of agriculture before pottery in north Chile. Considering the fact that nowhere does Bird come out strongly for preceramic agriculture and even Willey's somewhat bolder statements are hedged with uncertainty I am inclined to regard Munizaga's criticism as somewhat unjustified. While lauding Bird's fieldwork as the most scientific archaeology ever done in the Arica region Munizaga finds fault with Bird's conclusions on two other counts. He does not feel that Bird gives sufficient credit to Tiahuanaco influences or that (in the *Handbook* summary) he makes clear his reasons for setting up two painted pottery phases at Arica. Notwithstanding these minor criticisms Munizaga concludes by accepting Bird's chronology with only slight changes and rejecting Uhle's altogether.

Between Schaedel's introductory chapter and Munizaga's concluding one are scattered five appendices. These include a short description of exploration in the vicinity of Caleta Vitor by Abel A. Toro I.; a description by Munizaga of the analysis of ceramics from the Lluta, Azapa and Vitor valleys; a report on the preliminary analysis of textiles from various locations by Ingeborg K. Lindberg; Schaedel's description of a burial excavation; and the proposed new phase designations previously referred to. The latter appendix is the most important of the group and might more properly have been elevated to full chapter status.

The potential effectiveness of photographs in this volume is almost completely destroyed by poor reproduction. Some of the funds spent on plates might profitably have been diverted to the employment of a capable artist. Drawings, in general, are carelessly executed. In the editing department, the proofreading, especially of passages quoted in English, leaves much to be desired. Some explanation for editing deficiencies is given in the introduction by Luis Sandoval S., *Centro* director. Nevertheless, the importance of this synthesizing work called for better treatment and it can be hoped that future publications of the *Centro* will reflect a little more attention to these always important details.

James E. Officer
University of Arizona
Tucson, Ariz.

HANDBOOK OF MIDDLE AMERICAN INDIANS

Gordon R. Willey, chairman of a National Research Council committee seeking means of publishing a *Handbook of Middle American Indians*, announces that the National Science Foundation has made a substantial grant to begin the gathering and editing of the materials. The grant will be administered by Tulane University; the *Handbook's* general editor will be Robert Wauchope. Tulane has appointed an Editorial Advisory Panel whose members will be editors of individual volumes in the *Handbook* series. They are Gordon R. Willey and Gordon Ekholm (archaeology), Evon Z. Vogt and Manning Nash (ethnology and social anthropology), Howard F. Cline (ethnohistory), T. Dale Stewart (physical anthropology), Norman McQuown (linguistics), and Robert C. West (geography). The panel has already begun work on the outline and possible contributors to the *Handbook*, and the volume editors will soon begin to solicit articles.

NOTES AND NEWS

EDITED BY NATHALIE F. S. WOODBURY

Salvage archaeology in reservoir areas and on highway rights of way, and park development archaeology, both federal and state, dominate more than ever the activities in all North American areas. We are in an era comparable to the great dirt-moving period of the W.P.A. with public funds financing basic field work. The fact that some of the projects so financed carry funds and facilities for final reporting is an advance over the "dig it, store it" procedure that prevailed so often in the 1930's. To take full advantage of today's opportunity for basic research the opportunity to interpret and publish should be in every contract and the obligation to do so realized by every archaeologist.

CIRCUMPOLAR CONFERENCE AT COPENHAGEN

On May 19th, a group of 22 specialists in Arctic anthropology assembled in Copenhagen, Denmark, for a three-day series of conferences on the problems of their area. They came as guests of the Danish National Museum from eight countries: R. S. MacNeish from Canada; Kaj Birket-Smith, Erik Holtved, Eigil Knuth, Helge Larsen, Jørgen Meldgaard of Denmark; Auvo Hirsjarvi, Helmer Tegengren from Finland; Gutorm Gjessing, P. Simonsen from Norway; G. F. Debets, M. G. Levin, A. P. Okladnikov, S. P. Tolstov from the Soviet Union; Sverker Janson, Carl-Axel Moberg from Sweden; Henry B. Collins, J. L. Giddings, Elmer Harp, Jr., Froelich Rainey, Ivar Skarland from the United States; Hans-Georg Bandi from Switzerland. The project had grown mainly from the planning and effort of Birket-Smith, Larsen, and Rainey; its purpose was to discuss and plan future archaeological and ethnological research in the whole circumpolar area. The meetings were made possible by a generous grant from the Rockefeller Brothers Fund.

During the last several decades a considerable amount of work, particularly in archaeology, has been carried out in the far north, but the various efforts have been made without any over-all coordination. It does not minimize the splendid results of much of this research to state that we still face a tremendous complexity of problems and remain essentially atomized in our efforts to wrest our peculiar enlightenment from the geographic vastness of the north. The idea of cooperative effort in the circumpolar north dates back to the years immediately following the Fifth Thule Expedition of 1921-1925, when Knud Rasmussen and Birket-Smith discussed their observations in the Canadian Arctic, and Rasmussen then published, shortly before his death in 1933, a proposal for international circumpolar investigation. The first attempt to implement these ideas came the next year at the First International Congress for Anthropological and Ethnological Sciences in London when Birket-Smith was made recorder of a committee of renowned northern specialists, whose express purpose it was to examine the possibilities of united field work. A preliminary report was submitted to the second session of the Congress in Copenhagen in 1938, but the subsequent years brought on World War II, and the committee was dissolved almost before its real work had begun. Since the war, a new rapprochement has grown among scholars with these common interests, on both sides of the Atlantic, and in 1958 the time seemed ripe again for taking up the abandoned project.

After Birket-Smith's welcoming and introductory remarks to the conference, a series of regional appraisals was presented. Brief papers on circumpolar problems as seen from Greenland, Canada, Alaska, Siberia, and Scandinavia were read by Larsen, MacNeish, Giddings, Levin, Okladnikov, Debets, Gjessing, and Moberg, respectively. Each of these was followed by pleasant and profitable round-table discussion, often with the aid of representative collections of artifacts. An additional paper of great value was Levin's description of the materials from the Uelen site, near East Cape, Siberia. Problems of communication virtually disappeared in the face of the bi- and tri-lingual facility of some members of the conference, the official interpreters arranged for by the Danish hosts, and the simultaneous translations of Mrs. Froelich Rainey.

At the final session of the conference, all participants unanimously agreed in making the following resolution:

It is desirable:

1. To set up an international committee in continuation of the one which existed before the Second World War for the anthropological, archaeological, and ethnological study of the Arctic within the organization of the International Congress of Anthropological and Ethnological Sciences, and to set up national committees for the same purpose in Canada, Denmark, Finland, Norway, U.S.S.R., Sweden, and U.S.A.

2. To organize as often as possible international conferences, symposia, and other forms of international meetings of scientists working in the fields of anthropology, archaeology, and ethnology of the Arctic and sub-Arctic; to urge the cooperation in this work of linguists working on the languages of northern peoples.

3. To organize the exchange of museum specimens and illustrative material between scientists in institutions of different countries and also the systematic exchange of specialized literature.

4. To undertake international publication of material concerning the archaeology, ethnology, anthropology, and linguistics of the North, including collections of articles concerning specific problems under discussion.

5. To co-ordinate the publication of the archive material about the North, bearing upon the period from the 16th to the first half of the 19th century.

6. To encourage the exchange of scientists working in the scientific institutions of different countries.

7. To carry on joint consultations on questions concerning the planning of scientific investigations in the Arctic and sub-Arctic.

8. To take up at the next meeting questions concerning the unification of terminology and systems of local chronology in the archaeology of the Arctic and sub-Arctic.

9. To investigate the influence of more southerly cultures on the development of northern culture types, for example, the connections between the Dorset culture and the early cultures of the northeastern woodlands of North America.

10. To investigate the extension of Paleo-Eskimo cultures in Greenland and their affinities to corresponding cultures in the Canadian and Alaskan Arctic.

11. To undertake excavations on both sides of Bering Strait and particularly from the Yukon to Alaska Peninsula.

12. To make an intensive study of the Yukagir racially, linguistically, and culturally.

13. To study the connections and contacts between the Lapps (Sameh) and Samoyed (Nentsi).

14. To study the connections and contacts between the Neolithic and Bronze Age complexes in Scandinavia and the U.S.S.R.

15. To investigate Russian hunting camps on the islands and along the shores of the Polar Sea.

16. To undertake ethno-sociological studies of the circumpolar societies, with the view to the possibility of explaining cultural diffusion.

17. To study the effects of climate, both morphologically and physiologically, on the body of the circumpolar peoples.

18. To study the effect of isolates in the inheritance of physical traits among the circumpolar peoples.

19. To undertake continued anthropological investigations and comparative studies, including the study of the soft parts of the face, hair, pigmentation, dentition, and blood-groups. The largest gap in our present knowledge is in the area between the Kolyma and the Yenisei.

20. To correlate racial, linguistic, and cultural facts in the study of ethnogenesis.

The accomplishments of the conference can best be viewed in the light of Birket-Smith's earlier keynote remarks:

> As far as the task of the conference is concerned, it is, according to my view, not to discuss scientific problems as such. Of course, our ideas differ in several respects, and it is well so, for truth often results from the conflict of opinions. Our present task, however, should be mainly practical, that is: first an attempt at coming to an agreement upon the most burning questions and how they may be solved, and next the possibilities of carrying out such plans by coordination of our activities, and, what seems to me of paramount importance, if possible by actual cooperation in the field.

Probably no one expected that complete fulfillment of these objectives would result from this conference, literally the first of its kind. I believe, however, that all participants would agree that a long step forward has been taken, and that this initial momentum will carry the conference aims far. The delineation of problems that are held to be of mutual concern contains strong implications of coordination, and it is but another step or two on to the goal of actual cooperation in the field.

Not the least factor contributing to this degree of success was the opportunity afforded by the Danes for the conference to meet in an atmosphere of warm hospitality and good fellowship. The entire program was beautifully planned, faultlessly carried through, and the gracious environment created by the Danish hosts may never be surpassed.

ELMER HARP, JR.

ARCTIC

The western Arctic received the brunt of far northern field investigations during the summer of 1958; work done in the eastern sector will be summarized in a later report.

ALASKA. J. L. Giddings, Brown University, explored the entire coastline of Kotzebue Sound in a small boat with an Eskimo family and two Brown University students. One of his major aims was to correlate beach ridges with archaeological inclusions; he noted that there seems to have been no appreciable change in sea level over the last few thousands of years, since the earliest beach ridges are approximately as high as the current ones. At Choris Peninsula Giddings excavated the two remaining large oval houses of the Choris culture, estimated to be more than 3000 years old. Two beaches forward from this site he found Choris summer camps of probably a later date, and on the outermost beach house pits which date from perhaps A.D. 1400. At Cape Espenberg, where there are two miles of successive beach ridges, the oldest beach produced materials of the Denbigh Flint complex, and on two ridges of somewhat later date there were flints and pottery of the Choris culture. A lengthier succession of cultures was discovered at Cape Krusenstern where there were recent houses on the outermost beach, a new form of culture intermediate between Birnirk and western Thule on the 6th ridge, houses and other manifestations of Ipiutak culture on the 18th to 20th ridges, Choris-like flints on still earlier ridges, and Denbigh Flint complex objects on the earliest ridge of all. Terraces at various levels on the outposts of the Igichuk Hills at Cape Krusenstern also yielded Denbigh Flint complex material, as well as other forms, but nothing inconsistent with cultures thus far known in western Alaska.

Ivar Skarland, University of Alaska, reports that Frederick Hadleigh-West, under contract with the National Park Service, located the Tlingit fort at Sitka, destroyed by the Russians in 1804. Skarland continued his last year's work along the Denali Highway where a large number of flaked specimens from several hunting sites were discovered by road workers. These sites are hunting stations along ancient caribou routes, and the cultural material, found in blowouts on glacial deposits, is definitely post-Wisconsin in age.

John M. Campbell, Yale University, returned to the Brooks Range last summer, supported by a grant from the Arctic Institute of North America. One of his primary purposes, reconnaissance of the John River valley, was partially thwarted by severe flood conditions, but investigations on a headwaters branch of the Anaktuvuk River disclosed two new sites on the Arctic Slope. The first of these, situated on an end moraine, yielded considerable numbers of polyhedral cores, microblades, points, scrapers, and blades, but the relationships of this material are as yet unknown. The cultural deposit is shallow and apparently unstratified, but contains large quantities of food bone debris. Several clean samples of charcoal were obtained for dating purposes. The second new site covers a large area across the top of a long, low terrace. It is also unstratified and appears to date from a late prehistoric period. Campbell now thinks that he may have evidence of four separate cultural phases at Anaktuvuk Pass: the Kayuk complex, which he investigated during the summers of 1956 and 1957, and which appears to date somewhere between the Denbigh Flint complex and Ipiutak; the above-mentioned moraine site which has not

yet been dated; the late prehistoric site on the terrace; and an early historic manifestation. This work, coupled with Irving's previous research in the area, promises a valuable clarification of the prehistoric occupation sequence on the Arctic Slope.

YUKON TERRITORY. Richard S. MacNeish, Human History Branch of the National Museum of Canada, and Gordon Lowther, McCord Museum of McGill University, discovered 24 new sites on the Firth River representing six of the nine known archaeological phases in the area, and collected 500 stone and bone artifacts and 2000 potsherds. They excavated for three weeks in the Engigstciak site. An important result of the summer's work was the location of six new Flint Creek components containing 150 specimens. This phase is now clearly seen to be earlier than New Mountain and unconnected with the latter. It apppears rather to be linked with the cordilleran area in terms of its scraper planes, pebble choppers, Agate Basin-like points, and Lerma-like points. It also contains crude burins and occasional microblades struck from tongue-shaped cores. MacNeish now believes that Flint Creek is older than he had previously estimated. He was also able to clarify the British Mountain phase by isolating one small component, and he tested four additional New Mountain sites, of the small-tool tradition. Finally, other checks were obtained on the near-Ipiutak Cliff phase. Residual materials were late Eskimo, either Whitefish Station or Herschel Island.

KEEWATIN DISTRICT, N.W.T. Elmer Harp, Jr., Dartmouth College, accompanied by Robert A. McKennan, reconnoitered on the Barren Grounds west of Baker Lake. Late ice conditions prevented immediate travel into the farther interior, so two weeks were spent in the area around the western end of Baker Lake where seven sites were discovered; an eighth, located in 1955 by Father Guy Mary-Rousseliere, O.M.I., directly behind the Baker settlement, was excavated. Late in July the party left on a 300-mile, month-long canoe trip up the Thelon River and westward through Schultz, Aberdeen, and Beverly lakes. Thirty more sites were discovered on this circuit, and Harp made a 100-mile flight southwest to Grant Lake to check on the site found there in 1955 by the Arthur Moffatt party, as it canoed down the Dubawnt River. The expectation that evidence concerning the evolution of Cape Dorset Eskimo culture might be found in this general area was not fulfilled. There was some indication of Dorset influence around the western end of Baker Lake, but all other sites in the deeper interior are clearly associated with early cultures of the boreal forest and the plains. Connections appear to extend westward to MacNeish's Artillery Lake complex and southward to the Agate Basin site in Wyoming. All of the sites are concentrated at strategic points along the caribou migration routes, and, although the country is noteworthy for its extensive systems of postglacial raised beaches, the wide variation in site elevations does not seem to have any culture-historical significance. At virtually all levels, whether high or low, there was a juxtaposition of recent, or protohistoric, and prehistoric occupations. It is planned to examine these archaeological finds in the context of Birket-Smith's Caribou Eskimo theory, for such an analysis may develop some interesting facts concerning Indian-Eskimo relationships.

Assembled by ELMER HARP, JR.

SOUTHWEST

PECOS CONFERENCE. The 1958 Pecos Conference was held in Albuquerque from August 15 to 17 with the University of New Mexico as the host institution. Frank C. Hibben was chairman of the session, and the program was arranged with the assistance of Joe Ben Wheat and Marjorie Lambert. Field reports in archaeology and ethnology ranged from northern Mexico to the northern periphery of the Southwest. Special sessions were devoted to Early Man and related subjects, Indian claims archaeology, and a conference of southwestern museum personnel. One of the highlights of the meeting was a field trip to Pottery Mound where Hibben has been conducting excavation of the painted kivas. The 1958 Pecos Conference was attended by over 100 interested Southwesternists. An invitation was accepted to hold the 1959 meeting at Fort Byrdwin near Taos with the Wichita Foundation as host institution. Fred Wendorf was elected chairman of the interim committee which includes Richard B. Woodbury and Robert H. Lister.

UPPER COLORADO RIVER STORAGE BASIN. Under contracts awarded by the National Park Service to three institutions, University of Utah, Museum of Northern Arizona, and Museum of New Mexico, extensive salvage archaeology is under way in the Glen Canyon Dam section and the Navajo Dam section of the Upper Colorado River. A number of crews have been in the field, several hundred sites have been recorded, and excavation is in progress in some areas. Even at this early stage it is evident that a considerable body of valuable information will be gained from these projects. In some instances surveys by other disciplines are being carried on concurrently and more or less independently.

The Glen Canyon Dam Section. Since April, 1958, the University of Utah archaeological program has focused upon completion of the Glen Canyon survey and initiation of excavation. Surveys were conducted by crews under Thomas Mathews, James H. Gunnerson, and James Nichols. Robert Lister excavated the large Coombs site near Boulder, Utah, as the project of the University of Colorado Field School, and then resumed survey along the Colorado River. Because of the accelerated construction schedule which calls for completion of the coffer dam by February, 1959, the excavation of selected sites in Glen Canyon itself below the mouth of the San Juan was undertaken concurrently with a survey, first under the direction of Jesse D. Jennings and later under William Lipe. After this program was completed, Lipe began excavation in Red Canyon at the upper end of Glen Canyon. Nonpottery remains in lower Glen Canyon have not been identified with other manifestations in the

Southwest, but the ceramic sites indicate Kayenta affiliations at a late Pueblo II or early Pueblo III time period. Gunnerson's work on the Kaiparowits Plateau indicates that this was the main habitation area for people living seasonally down in the canyons. Nichols found a large number of sites in the Escalante Desert, while Mathews found Kayenta trade wares in the Grand Gulch area. At Salt Lake City a laboratory to process the materials from these projects has been set up under the direction of Dee Ann Suhm, assisted by Mary Mulroy.

Field work of the Museum of Northern Arizona Glen Canyon project during the past year, under the direction of William Y. Adams, has concentrated on an intensive survey of the lower 71 miles of the San Juan River and its major southern tributaries. Adams believes that the lower San Juan was utilized only for scattered summer farms by the Mesa Verde people who inhabited the highlands on the north side of the river and by the Kayenta people who inhabited the highlands on the south side of the river, although the San Juan seems to have served as a general rather than an absolute boundary. Occupation appears to have been confined to the 12th century and the early decades of the 13th century. Salvage excavation of selected sites in the lake basin area will be undertaken during the field program of the second year.

The Navajo Dam Section. The Museum of New Mexico has completed its third season of salvage investigations in the Navajo Dam Section of the Upper Colorado River Storage Basin. Excavations directed by A. E. Dittert were in a paleo-Indian site, a large Rosa phase site, two caves with both Rosa and Gobernador phases represented, one cave with a large amount of Rosa perishable material, a cairn burial, and a Navajo village where work was begun in 1957. Last summer's work also included studies of alluvial sections and a correlation of these with the historic and prehistoric occupations. Faunal and botanical studies have also been initiated. Tests at other sites have provided an excavation program for 1959. Since salvage archaeology has been completed in the sections to be affected by initial construction, the future work is planned in terms of problems which have arisen from the previous surveys and excavations.

ARIZONA. Harold S. Colton, Director of the Museum of Northern Arizona in Flagstaff since its founding in 1928, resigned effective December 31, 1958. Edward B. Danson, who has served as assistant director since June 1956, was appointed Director of the Museum of Northern Arizona and its Research Center by the Board of Trustees of the Northern Arizona Society of Science and Art. In October, 1958, Dr. and Mrs. Colton were feted on their 30th year of active service to the Museum of Northern Arizona and their 45th year of research in Arizona.

The Museum of Northern Arizona excavated in a Pueblo I site on O'Leary Mesa and dug one house and tested a trash mound at a Sacaton phase ballcourt site on the Verde River six miles south of Camp Verde. At Montezuma Well, the Museum, under contract with the National Park Service, has commenced stripping an occupation area. This winter the Museum will investigate a cave on the Orme Ranch which may contain Apache material.

In cooperation with the Museum of Northern Arizona the University of Illinois Field School, directed by John C. Mc.Gregor and William J. Beeson, worked at the Pershing site on the Pollock Ranch southeast of Flagstaff. Six large pit houses and a very large structure, possibly ceremonial in function, were excavated in this Sinagua village of perhaps 20 structures which was occupied around the end of Pueblo I and beginning of Pueblo II.

At the instigation of Paul S. Martin a conference on the taxonomy and definition of Cibola White Ware types took place September 19 and 20 at the Museum of Northern Arizona. The participants agreed on a number of redefinitions, the assignment of several previous types to varietal status, and the urgent need for further study of several supposedly well-established types. Final results will be published in the Museum's *Ceramic Series*.

Paul S. Martin and John B. Rinaldo of the Chicago Natural History Museum excavated in a late pueblo ruin near St. Johns last summer. The ruin occupies two knolls and the saddle between, with some of the rooms built on the slope at two different floor levels. Jeddito Black-on-yellow and the Zuni glazes characterize the painted pottery of this site in which about 50 rooms and two kivas were excavated on one knoll. The other knoll was extensively trenched, revealing a kiva and several secular rooms.

The 13th annual session of the University of Arizona Archaeological Field School at Point of Pines was attended by 22 graduate and undergraduate students representing 11 colleges and universities in this country. Included in this group were two foreign students, from Germany and India. Carlos Angulo V., Director of the Instituto de Investigaciones Etnológicas, Universidad del Atlántico, Baranquilla, Colombia, and Guggenheim Fellow was a collaborator in the excavation program. Late in the session Gutorm Gjessing, Director of the Ethnographical Museum, University of Oslo, Norway, and Fulbright grantee, made a preliminary study of the petroglyphs of the Point of Pines region. A grant of $19,700 from the National Science Foundation for a three-year period of greatly expanded research efforts made it possible for the Field School to supplement its usual student training activities with a program of intensive excavation using Apache laborers. As a part of the National Science Foundation program Murray Gardner, University of Arizona geology graduate student, mapped several sites and clusters of sites, and a number of areas illustrating the different types of agricultural terraces and check dams.

Excavations were carried out at five different sites, but the main efforts were concentrated on two large ruins: the Point of Pines ruin (Arizona W: 10: 50) and the Turkey Creek site (Arizona W: 10: 78). Last summer was the 12th and final season on the Point of Pines ruin; 14 rooms were cleared and extensive trenching was employed to define the limits of the several building units on the site. Work on this site — largely done by students — was under the direction of Raymond H. Thompson who was assisted by Elizabeth A. Morris.

The Point of Pines ruin was continuously occupied from about A.D. 1200 or 1250 until about 1450. The phases represented are: Tularosa, Maverick Mountain, Pinedale, Canyon Creek, and Point of Pines. The first occupation of the site was a pit house village of the Tularosa phase over part of which a Tularosa masonry pueblo was constructed. Contemporaneous with this structure is a separate masonry pueblo which was built about 1285, according to abundant tree-ring evidence, by immigrant people from the Kayenta region of northern Arizona. This intrusive Maverick Mountain phase village was systematically destroyed by fire about 1300 probably by the local people, who, fearing a reprisal, constructed a large defensive wall which enclosed what is now the central portion of the site. This construction took place in the Pinedale and early Canyon Creek phases. The local population was rapidly expanding because of the influx of people from nearby areas in the White Mountains and by late Canyon Creek times the pueblo was a large town with a great kiva enclosed in a room block of several hundred rooms which extended way beyond the area delimited by the abandoned defensive wall. About 1400 the breakup of this town into eight or ten smaller villages, built on the ruins of the older structures or on nearby ridges, marks the beginning of the Point of Pines phase. About 1450 these fragmented remnants of the large town — and the entire Point of Pines region — were abandoned by people of mixed Mogollon-Anasazi tradition.

Excavations were made at the Turkey Creek site by a crew of Apache workmen under the supervision of Emil W. Haury, Director of the Field School, assisted by Alfred Johnson. This site is a large masonry pueblo about 3 miles west of the Field School camp. Occupied from about A.D. 1100 to 1200, it appears to be transitional between the Reserve and Tularosa phases as currently defined in the Point of Pines region. Pottery is overwhelmingly Reserve Indented Corrugated with smaller quantites of McDonald Painted Corrugated, both Reserve and Tularosa Black-on-white, Wingate Black-on-red, Houck and Querino polychromes (which are demonstrably earlier than St. Johns Polychrome at this site), Mimbres Black-on-white, and Sacaton Red-on-buff (Safford variety), but Tularosa Fillet Rim, McDonald Patterned Corrugated, and St. Johns Polychrome are almost entirely lacking. Approximately half of the pueblo was excavated last summer: 152 rooms, some of which were very small, probably dating toward the end of the occupation of the site; a few pit houses underlying the masonry rooms; two enclosed plazas; a great kiva inside the larger of the plazas; extensive trash testing which produced 52 burials and seven cremations.

The 14th annual session of the University of Arizona Archaeological Field School will be held at Point of Pines from June 12 to August 7, 1959. Inquiries and applications should be addressed to the Department of Anthropology, University of Arizona, Tucson. Plans for next summer include the clearing of the rest of the rooms in the main room block and extensive burial excavation at the Turkey Creek site, and the excavation of the Dry Prong site, a Reserve phase pueblo with a great kiva and water-storage reservoir located about 20 miles northeast of the Field School headquarters.

The Arizona State Museum, under contract with the National Park Service, began salvage excavations last fall in the Painted Rocks Reservoir area near Gila Bend. The first phase of this work is the excavation of a Sedentary period Hohokam site under the direction of William W. Wasley. One of the problems to be clarified is the nature of the village pattern in this type of site, which has an associated ball court, a number of trash mounds and possibly a house mound in addition to the usual domestic structures that are unidentifiable by surface inspection.

Arizona has become the 48th state to inaugurate a state park system. The first Arizona state park includes a portion of historic Tubac on the Santa Cruz River between Tucson and Nogales. The Arizona State Museum has a contract with the Arizona State Parks Board to do intensive research on the history of Tubac. This phase of the work, being done by Henry F. Dobyns, will be completed early this spring. It is anticipated that a subsequent phase of the Tubac project will involve excavation and some stabilization of the Spanish and early Anglo structures. It is interesting to note that there is also some evidence of prehistoric occupation in the immediate vicinity.

The long-term interdisciplinary study of the utilization of arid lands, financed by the Rockefeller Foundation at the University of Arizona, includes research in geohydrology, geochronology, climatology, biology, and archaeology. The last-named phase of the program will be started in January by Richard B. Woodbury, who is leaving Columbia University to join the Department of Anthropology in Tucson for this purpose. His work will include study of aboriginal agriculture practices, especially in the prehistoric Southwest, of changing human adaptations to changing climates in arid regions, and of long-term effects of human occupation of arid areas, both environmental and social.

CHIHUAHUA. The Joint Casas Grandes Expedition of the Instituto Nacional de Antropología e Historia and the Amerind Foundation has been in the field since last fall on its first season of excavation in the famed Casas Grandes ruin near Nuevas Casas Grandes in Northwestern Chihuahua, Mexico. The project is being carried out under the general supervision of Charles C. Di Peso and Ignacio Bernal. Excavation is being directed by Di Peso with the collaboration of Alfonso Contreras and the assistance of Boyd Wettlaufer.

COLORADO. The University of Colorado Museum under the direction of Joe Ben Wheat, with students from the University of Colorado and from Beloit College, continued excavations on a small pueblo site near Yellow Jacket. Pueblo II and early Pueblo III pit rooms and an early Pueblo III kiva were excavated. An earlier masonry pueblo and kiva were discovered. Work at this site will continue next summer.

NEW MEXICO. The University of New Mexico summer field session was again conducted at Pottery Mound. Work was mainly concentrated on several painted kivas

which had not been finished from the previous year's excavation; two additional painted kivas were discovered. A number of murals were uncovered and copied, enlarging the already considerable collection of these kiva murals from Pottery Mound. All of the kiva paintings date from the Pueblo IV period.

Charles Lange of Southern Illinois University is working out the culture history of the Cochiti, attempting to establish definite ties between Cochiti and prehistoric remains in the area between Bandelier National Monument and the Cochiti Indian Reservation. One portion of this program involved the excavation of a 16-room site north of the reservation on the Rancho de la Cañada Grant. The decorated pottery of this site was primarily Santa Fe Black-on-white.

Assembled by WILLIAM W. WASLEY

PLAINS

So much archaeological work went on in the Plains in the summer of 1958 that the Assistant Editor has had to slash the accounts drastically in a vain attempt to keep the record within a reasonable compass. Apologies are due to both field workers and readers for necessary omission of considerable relevant detail. The major work was, as usual, in the great reservoirs on the Missouri, where the history of Plains village horticulture continues to be worked out and more is also being learned of preceramic developments. In the western Plains, bison kills of all ages are making the archaeological news.

ALBERTA. Richard G. Forbis, archaeologist of the Glenbow Foundation in Calgary, reports that the main 1958 project of the Foundation was the excavation from May to September of the Old Woman's Buffalo Jump (EcPl-1) near Cayley, 50 miles south of Calgary. Field direction was by David Quapp and Donald R. King. The deposit is at least 25 feet deep; ground water at that depth halted further operations. The top half of the deposit contained Late Prehistoric small side-notched points, the lower half Middle Period large corner-notched points. There were no trade goods; here, as elsewhere, the coming of the horse seems to have ended the use of the buffalo jump in favor of the surround. More work will be done at this site in 1959. Forbis and Quapp carried on extensive survey work from July to September, covering much of the area from Southern Alberta to the Peace River country.

SASKATCHEWAN. William J. Mayer-Oakes, assisted by Zenon S. Pohorecky, made a four-week preliminary survey of part of the South Saskatchewan River Reservoir area. The work was done for the Canadian National Museum, with substantial cooperation from the Saskatchewan Museum of Natural History. One Late Prehistoric ceramic site and 21 nonceramic sites, none of them believed to be earlier than 1500 B.C., were found. The area is unexplored archaeologically and information from it should be of interest. A more extensive survey is planned for 1959.

MONTANA. Thomas F. Kehoe of the Museum of the Plains Indian, assisted by Ruth Gruhn, worked from June until late autumn at the Boarding School Drive site, 24GL302, on the Blackfoot Reservation near Browning. The work was supported by funds from the Louis W. and Maud Hill Family Foundation and by labor provided by the Blackfoot Tribe and the City of Browning. This was the first of several seasons planned at the site. Tests as deep as 8 feet were made at the drop-off, the kill and butchering area, and the camp. Three distinct bone layers were found, the top two containing Late Prehistoric side-notched points, and the bottom layer containing a large corner-notched point. The work at this site should reveal a great deal about the organization of bison kills over a long period of Plains prehistory.

WYOMING. Raymond C. Bentzen, President of the Wyoming Archaeological Society, which has headquarters at Sheridan, reports two projects carried out in the summer of 1958. From July 4 to 6, 21 members of the Society excavated at Kaufmann Cave, between Ucross and Ulm about 30 miles southeast of Sheridan. The cave is small, and a large fallen rock had protected a good deal of cultural material from vandals. Abundant faunal material, charcoal for radiocarbon samples, and eight projectile points including typical Allen and Pinto Basin styles, were found. During August 2 to 15 a major project was carried out at the famous Medicine Wheel in the northwestern corner of the Big Horn National Forest. The stones of the wheel itself were not disturbed. A detailed map was made of the wheel and its environs. Excavations revealed numerous artifacts and bison bones, and charcoal was obtained from a fire pit believed to be of the same date as the wheel. Sixteen members of the Society participated in the project, and, thanks to a new road making the site accessible, visitors averaged about 100 per day.

David Gebhard of the Roswell, New Mexico, Museum, directed a field party which excavated a late Middle Period rock shelter at Torrey Lake. Most of the points were corner-notched. A number of flat sandstone objects, thought to be fish sinkers, were found. A Late Prehistoric site in the Big Horn Basin also was dug.

In the Glendo Reservoir on the North Platte in eastern Wyoming, a Wyoming State Museum-University of Wyoming-National Park Service field party under William Mulloy and Louis Steege continued a major salvage project from June 15 to July 13. A stratified two-component site, a Middle Period cave site, stone rings, and a Late Period nonceramic site were investigated.

George A. Agogino carried on brief reconnaissance of preceramic sites in Castle Garden, the Popo Agie Valley, and the Eden Valley, all in western Wyoming.

COLORADO. Joe Ben Wheat and a party of five students from the University of Colorado and Beloit College dug July 9 through August 1 at the Olson-Chubbock site, a paleo-Indian site about 15 miles southwest of Cheyenne Wells in eastern Colorado. Harold E. Malde and Edward Lewis of U.S.G.S. helped in special phases of the work. The site is a fossil arroyo containing the remains of about

120 bison tentatively identified as *B. occidentalis*. Eden, Scottsbluff, and Milnesand points were found, as well as points of another form like an unshouldered Scottsbluff. Perhaps the main significance of the site lies in the abundance of information gained on butchering patterns. This seems to have been a single kill, the upper animals having been shot and butchered, and those below having been trampled, and butchered very little.

North and South Dakota. The "15½th Plains Conference," an informal conclave of field workers on the Middle Missouri and other interested scholars and observers, took place July 26 to 27 at Pierre, at the instigation of Alfred W. Bowers. The chief item on the agenda was a discussion of the concepts of pottery ware and pottery type as they have been applied in the Plains.

A concerted effort was made by the 13 field parties on the Middle Missouri last summer to secure a series of dendrochronological specimens from living trees. As of late July, specimens of cedar containing about 300 annual rings had been obtained. This should bridge the gap into the prehistoric period and provide a tie with available archaeological specimens. The work is being coordinated by the Missouri Basin Project of the Smithsonian Institution.

Oahe Reservoir Area. The Oahe Dam above Pierre was closed August 3, 1958, and the lower part of the reservoir began to fill. The reservoir will eventually extend about 250 miles upstream, nearly to Bismarck. Eight field parties were working in the area last summer, five of them from the Missouri Basin Project and three from local institutions cooperating with the National Park Service.

James H. Howard and a crew of nine spent June 17 to August 1 at the Tony Glas site, 32EM3, on the east bank of the Missouri about 26 miles due west of Strasburg in southern North Dakota. This was a project of the North Dakota State Historical Society, the University of North Dakota, and the National Park Service. Two large rectangular earth lodges and a corner of the fortification ditch were excavated. The site appears to belong to the "Archaic Mandan" culture of Will and Hecker, and shows close resemblances to the Thomas Riggs and Ft. Yates sites. Scattered human bones in the floor fill and artifacts of human bone suggest that the inhabitants may have been cannibalistic. Artifacts include several types previously unknown or very rare in the Plains area, such as shaft wrenches of elk antler in the form of a bird's head, flanged axes of marble, thunderbird forms of shell, and elk antler armor. The work at this site should help in tracing the introduction of Mississippian traits into the northern Plains.

Alfred W. Bowers and a University of Idaho-National Park Service field party worked for a second season at the Anton Rygh site about 11 miles north of Mobridge.

A University of South Dakota-National Park Service-South Dakota Archaeological Commission field party of nine men, directed by Eugene Fugle, worked June 18 to August 8 at the Four Bear site, 39DW2, near the mouth of Buffalo Skin Creek about 20 miles north of Cheyenne Agency. A trench was run more than half the length of the site, one ovoid earth lodge 60 feet in diameter was dug, 40 earth lodge depressions were mapped, and a palisade was located on the south side of the village. Eleven burials were excavated in a cemetery west of the site; they were shallow, both primary and secondary, and lay on wooden planks. The site is believed to be the Arikara village visited by Lewis and Clark in 1804. Trade material was found in both the burials and the village, and the predominant pottery was Stanley Wavy Rim and Le Beau. More work may be done here.

The Missouri Basin Project (hereafter referred to as M.B.P.) had four major parties in the Oahe area; a fifth mobile field group mapped ten sites soon to be inundated. M.B.P. Party Number 1 under Robert L. Stephenson, with 20 men, worked June 16 to September 3 for the third and final season at the Sully site, 39SL4. At least two round-house components are identifiable, the earlier one having houses with widely spaced posts and short entryways, and the later one having houses with short or long entryways and closely spaced wall posts. No fortification ditch was found. The work here constitutes the largest sampling of the late circular-house occupation from the largest known site in the Middle Missouri area.

Also at the Sully site, M.B.P. Party Number 3 under William M. Bass, with eight men, excavated 161 burials, which were shallow, predominantly flexed, and oriented toward the west or northwest. Limited work was also done at the Whistling Hawk site, 39SL39, near Sully. Bass, a physical anthropologist, now has more than 225 individuals with abundant associative data for a detailed study, thus no further excavation of burials is contemplated in the Sully area.

M.B.P. Party Number 2, under Charles H. McNutt with ten men, was in the field June 17 to August 24 investigating nine sites in the Fielder Bottom-Telegraph Flat area, and one site each in the Little Bend area and the Peoria Bottom. The work was a continuation of the 1957 project, intended to sample the smaller sites in the vicinity of the major Sully site. Both long-rectangular and circular houses were found, one- and two-component sites were tested, and fortified and unfortified sites investigated. Ceramics are of the Thomas Riggs and La Roche styles. The precise relationship of components has not yet been determined, but the range of variation in the cluster of sites in the Fielder Bottom-Telegraph Flat area has been reasonably well determined.

M.B.P. Party Number 4 under Richard P. Wheeler with nine men worked June 25 to August 25 at four sites near Fort Bennett. Most of the work was at the H. P. Thomas site, 39ST12, where at least five components were distinguished. Three of these appear to be assignable to the Anderson-Monroe, Stanley, and Snake Butte foci. Test excavations at Agency Creek (39ST41), Lounsbury (39ST42), and Ramsey (39ST36) yielded sherds characteristic of the Bennett Focus. Another season of work is contemplated in this area unless the sites are submerged by the rapidly filling Oahe pool.

M.B.P. Party Number 5 was a mobile party under Harold A. Huscher with two men, concerned with mapping and testing sites on both sides of the river. Ten sites

were mapped, including the four worked by Wheeler, between July 31 and August 24. On the latter date Huscher fell from a photographic ladder and sustained injuries serious enough to put him in the hospital and cancel plans for testing further sites.

Big Bend Reservoir. In the Big Bend Reservoir area near Fort Thompson, some 25 miles north of Chamberlain, five M.B.P. parties were at work. Party Number 6 under Warren W. Caldwell with 14 men worked June 10 to August 12 at the Black Partizan site, 39LM218, completing work begun in 1957. Investigations were made of houses, the moat, and an abundant midden area. There were at least three components: (1) rectangular house, Thomas Riggs pottery; (2) square house with rounded corners, Thomas Riggs and La Roche pottery; (3) circular houses, Stanley and Talking Crow pottery. The exact relationship of the components has not been determined as yet. Caldwell also dug a circular house, with Talking Crow pottery associated, at 39LM214 immediately north of Black Partizan.

M.B.P. Party Number 7, under Bernard Golden with nine men, worked June 10 to August 20 at the Hickey Brothers site, 39LM4, north of the Black Partizan site. This was a site with a defensive ditch enclosing an area with several house depressions. Despite extensive and intensive excavations, no houses were located, although a defensive bastion was exposed. The artifacts, which were scarce, included Stanley and Thomas Riggs pottery. The site seems to have been used for a very short time.

M.B.P. Party Number 8 under William N. Irving with 12 men worked May 1 to September 1 on preceramic components at the Medicine Crow site, 39BF2, and other sites in the vicinity of the site of the Big Bend Dam. Results from Medicine Crow are in essential agreement with those of 1957, reported in these columns and at the annual meeting of the Society for American Archaeology. In a 3- to 6-foot section of loess are three major occupation zones representing the Early, Middle, and Late Prehistoric periods, and each zone contains two or more components. The basal section of a small fluted point was found associated with charcoal in the lowest zone, along with other points including some resembling those of the Frontier complex.

In connection with the Medicine Crow work Alan Coogan, geologist, studied river terraces and eolian deposits for information bearing on chronology and environment. Kathryn H. Clisby, palynologist from Oberlin College, made a reconnaissance of the area for pollen-bearing sediments. Pollen is preserved in parts of the Medicine Crow site, but pond and wet meadow deposits nearby failed to yield enough material. Further search is anticipated.

Irving also worked at the Aiken site, 39BF215, in a spillway area of the Big Bend Dam. Here were found two ceramic horizons overlying several nonceramic ones, in a deposit 20 feet deep. Further work here may help to refine the late preceramic and ceramic sequence in this area.

Extensive reconnaissance in the Fort Thompson area showed many small preceramic sites in the loess on the river terraces. Most of them are too small to merit excavation, but their very presence adds a new dimension to studies of Middle Missouri prehistory.

While Irving was investigating the preceramic components at Medicine Crow, M.B.P. Party Number 10 under James J. F. Deetz with 11 men worked June 10 to August 30 in the ceramic components of the same site. This was the second season of this work, and a third is contemplated. Four components, some with clear stratigraphic relationships, have been distinguished. The latest is Stanley focus. Next earlier is Fort Thompson focus. Earlier are two unnamed components, one represented by bell-shaped cache pits with Talking Crow ware, and the other by a fragmentary house. This is the first clearcut case of Stanley focus occupation south of the Oahe Reservoir.

M.B.P. Party Number 9 under Robert W. Neuman with ten men worked May 19-August 22 in four sites on the east side of the Missouri and three sites on the west side, all in the Fort Thompson area. The Akichita site, 39BF221, and the Truman Mound site, 39BF224, on the east side, had seen earlier work in 1957. No houses were found at Akichita but the abundant artifacts showed clear relationships with Anderson-Monroe. Two types of burials were found in the mounds at the Truman Mound site, secondary in shallow burial pits, and primary in deep ovoid pits. The artifacts suggest Woodland affiliation but the pottery is simple stamped. A preceramic component was found below the mounds, with concave-based triangular points and ovoid knives. One other mound site, 39BF270, was investigated with results similar to those at Truman Mound. The documentation of these little-known mounds in the Big Bend Reservoir is a significant contribution.

NEBRASKA. The primary field work of the Nebraska State Historical Society last summer was a salvage survey of the Interstate Highway area between Omaha and Lincoln. Two areas have been earmarked for excavation. An excavation was also made of a soldier's burial, around 1823, at the site of Fort Atkinson north of Omaha. Marvin F. Kivett was in charge of the Historical Society field work, with Tom Witty as assistant.

The Historical Society also worked June 26 to August 22 at a site believed to be the historic Oto-Missouri village of 1775-1835, on the Platte River near the mouth of the Elkhorn about 40 miles northeast of Lincoln. Inconclusive work had been done at this site in 1935; more work has been needed to learn about the archaeological manifestations of the Oto and Missouri, who with the Iowa are thought to have been responsible for the western Oneota aspect sites. The work last summer produced enough pottery to show that the typical shell-tempered Oneota ware was almost totally absent. The pottery was grit-tempered and like that found in historic Pawnee villages of the same area. The site would certainly be assigned to the Pawnee if it were not for reasonably specific documentary evidence that it is the Oto-Missouri village.

At the Historical Society's Fort Robinson Museum in northwestern Nebraska, Roger T. Grange, Jr., found time

for some field work despite a steadily increasing stream of visitors to this interesting site of the closing years of the Indian Wars. Preliminary excavations were carried on at the Red Cloud Agency site, 25DW54, occupied 1873-77. These and later excavations are planned toward development of interpretive markers and displays. The work may also provide a start toward a study of Teton Dakota archaeological sites in the area.

KANSAS. Roscoe Wilmeth of the Kansas State Historical Society has completed a survey of the Pomona and Melvern reservoirs, small reservoirs on Dragoon Creek and Marais des Cygnes River in Osage County, east central Kansas. Seventeen sites, two of them multicomponent, have been located. The periods represented are Archaic (probable), Woodland, Upper Republican-Nebraska, and 19th century Sac and Fox. Work in this area should provide links between the Tuttle Creek Reservoir on the Blue River to the north, and the Toronto Reservoir on the Verdigris to the south, and should rough out a good preliminary picture of developments in eastern Kansas. Wilmeth reports that a legislative appropriation for equipment will permit field work in 1959.

Earl Monger of Macksville, Kansas, is investigating small Woodland sites on abandoned meander scars marking the former course of Pawnee Creek in Pawnee County, in central Kansas southwest of Great Bend. The specimens are being placed on display at the Fort Larned Museum. Carlyle S. Smith of the University of Kansas made a one-day survey of the sites and a brief examination of the artifacts, and feels that the complex is related to the Keith focus, if not directly assignable to it.

OKLAHOMA. James B. Shaeffer of the Oklahoma Archaeological Salvage Project surveyed a number of construction projects during the summer and located a late pottery site in the Panhandle. Sherman P. Lawton conducted a survey of 34 small reservoirs in the Sandy Creek watershed near Ada in south central Oklahoma. The work was sponsored by the University of Oklahoma, the National Park Service, and the Soil Conservation Service. A number of sites were recorded, but no important ones are threatened. Lawton also surveyed the Waurika Reservoir area on Beaver Creek in southern Oklahoma, about 50 miles northeast of Wichita Falls, Texas. This survey was sponsored by the University of Oklahoma, National Park Service, and Bureau of Reclamation. The sites were small and scattered and no intensive excavation is indicated. (Other work in Oklahoma is reported in the Southeast section of Notes and News.)

TEXAS. The National Park Service has closed its River Basin Surveys office in Austin, and henceforth all salvage work in Texas will be done through contracts. The University of Texas will be doing much of the work, and the Department of Anthropology has set up the Texas Archeological Salvage Project to handle contract salvage. T. N. Campbell is Director, and Edward B. Jelks, formerly of the Park Service, is in immediate charge. Other staff members are Lathel F. Duffield, archaeologist, and W. A. Davis, assistant. Meanwhile, the regular staff of the Department of Anthropology has been augmented by the appointment of an additional Research Archaeologist, Jeremiah F. Epstein. He and other members of the department will participate in the work of the Salvage Project.

The Salvage Project opened operations on August 4 at Iron Bridge Reservoir on the headwaters of the Sabine River in the prairie country 50 miles due east of Dallas. Duffield and Davis with a crew of six excavated at the Limerick site, 41RA8, on Hooker Creek, and found a superficial Caddoan occupation related to the Sanders focus, overlying Archaic materials of a hitherto undefined complex. An intensive surface survey was made at the nearby Pearson site, 41RA5, which produced both native and European goods. This site, which will be excavated next year, is believed to be a village of Tawakoni and Yscanis visited by Fray Calahorra in 1760. On September 1 Duffield and Davis moved to the Ferrells Bridge Reservoir in east Texas. (Other work at Ferrells Bridge is reported in the Southeast section of Notes and News.)

R. K. Harris and W. W. Crook, Jr., of the Dallas Archaeological Society, have been investigating a number of Carrollton focus Archaic sites in alluvium on tributaries of the Trinity River. Unlike the usual situation in the area, faunal remains are well preserved. The fauna is the same as that found today in the area, even to the snails, and include *Bison bison* identified from horn cores. The Carrollton focus appears to date back to the beginning of modern climate, at least 6000 to 7000 years ago. Crook and Harris note that from paleo-Indian to ceramic times the Indians in the Dallas area seem always to have eaten everything the countryside could provide, bison, deer, mouse, snails, hackberry seeds, and so forth. Projectile point types change in the sites, but little else.

Assembled by E. MOTT DAVIS

NORTHERN MISSISSIPPI VALLEY

ILLINOIS. A field party of the Illinois State Museum, under the direction of Joseph R. Caldwell, spent ten weeks at the Twenhafel site, west of Murphysboro, in southern Illinois. One purpose of the work — to discover some of the features of Hopewellian settlement in this area — was notably unsuccessful. Excavation in ½ acre of a settlement area yielded four Mississippian wall-trench houses amid a welter of "Crab Orchard-Hopewellian" and later Woodland pits and random postholes, but no discernible Hopewellian structure patterns. Analysis of the pottery from a large number of pits and a deep Crab Orchard occupational zone may show a transition from a Crab Orchard phase of occupation with some Hopewellian sherds to a Korando-like Later Woodland.

Much of the archaeological work conducted by the University of Illinois during the past year was in salvage. W. J. Beeson, University of Illinois, and James Gilihan, Southern Illinois University, directed the excavation of the Gamble site lying in the highway right of way near Lawrenceville; Middle and Late Woodland materials were found.

Two salvage projects not connected with highway construction were conducted at Upper Mississippi sites in the Chicago area. In August Elaine Bluhm and Jeremiah F. Epstein of the Illinois Archaeological Survey, and Alan Liss of the Chicago Natural History Museum, excavated a rounded rectangular house 55 feet long and 13 feet wide at the Anker site. A total of eight rounded rectangular houses were mapped and partially excavated by Bluhm, assisted by Gloria Fenner, at the Oak Forest site located on the Cook County Hospital grounds. The houses, which were exposed as the land was being leveled for a new cemetery, varied in length from 25 to 45 feet and from 10 to 15 feet in width.

Iowa. Seventeen students enrolled for the 1958 field season of the University of Iowa directed by Reynold J. Ruppé at Toolesboro. A Woodland village with three occupations and a burial mound were investigated. The earliest level is marked by Marion Thick pottery, the middle level is Middle Woodland characterized by Havana and Naples wares, and the upper level contains Weaver sherds. A fairly large number of stone tools offer the possibility of establishing some refinements in Woodland tool typology. No houses or postmold patterns were found but large numbers of storage and fire pits were excavated. No definitely Hopewell traits were present in the assemblages, with the exception of a single obsidian flake. The burial mound, one of a group of four, was 500 feet from the village site. It contained a central, subfloor, rectangular burial pit and a circular fire pit full of ashes. Three primary burials, all extended and each with a Hopewell Zoned vessel, were interred in the central pit. No other grave goods were found. One secondary burial was found on the surface of the primary mound and another may have been destroyed by a pot hunter's pit. No evidence was found to link the village site with the mound group.

The highway salvage program in Iowa is off to a good start, but there are yet no means of conducting the preliminary surveys. The Iowa Highway Commission has notified Ruppé of four sites uncovered during construction and in each case the contractors have ceased work in the area until the materials could be removed.

Missouri. The University of Missouri again had a full program of summer field work with five parties in the field. Salvage operations in the Pomme de Terre Reservoir area continued with a grant from the National Park Service under the direction of W. Raymond Wood. Additional information on the cultural sequence of the area was gained from the excavation of a cave, a shelter, two open campsites, two rock cairns, and three mounds. The existence of a Middle Woodland period culture, heretofore only suspected, was definitely established.

Carl H. Chapman continued salvage, also with a grant from the National Park Service, in the Table Rock Reservoir. A two-center-post house was unearthed and preliminary work begun on the mound at the Loftin site near the mouth of James River which produced evidence of a large tamped earth structure. Work continued on this structure during the fall. The Joseph Philibert trading post site was investigated and though some trade materials were found, no definite structures could be determined. Dale R. Henning was appointed Research Associate in Archaeology at the University of Missouri to conduct final salvage work in this area.

Richard A. Marshall continued research in the Ozark Highland area of central Missouri under a new grant from the Lucy Wortham James Foundation. Five village sites, three mounds, a rock cairn, and two shelters were excavated. The Meramec Spring focus was defined and information added to the local cultural sequence spanning several thousand years.

The University of Missouri Summer Field Session in Midwestern Archeology at four "salt pan" sites in Ste. Genevieve County, was led by Richard O. Keslin. A search for house sites was unsuccessful but a basin-shaped structure of tamped earth about 35 inches in diameter and 8 inches in depth was discovered and is interpreted as having been used in the manufacture of salt pans.

The Missouri Archaeological Society-University of Missouri dig in Research Cave during the month of June produced more dry materials. J. Mett Shippee supervised this work and later excavated more than 25 burials in a mound of the Steed-Kisker focus near Kansas City.

Ohio. During the summer the Ohio State Museum-Ohio State University field party, under the direction of Raymond S. Baby, assisted by Asa Mays, Jr., spent its second and final season at the Zencor site, a Late Woodland village located just south of Columbus. A Ford tractor and blade, furnished by the Ohio Tractor and Implement Company of Columbus, was used to strip over 7500 square feet of the site exposing numerous subsoil features, including a circular house pattern and a large burial pit containing four extended burials. Three of the four burials showed signs of mutilations, with evidence of complete scalping on one.

Wisconsin. The Gullickson rock shelter in Jackson County was investigated in August by Warren L. Wittry, State Historical Society, assisted by James Porter, University of Wisconsin student. Photographs, surface prints, and full-scale drawings were made of the more than 36 petroglyphs on the shelter's walls. Excavation of the floor deposit showed occupation over the past 2000 years. It is believed that the petroglyphs were made by the last prehistoric occupants of the shelter, of Upper Mississippi time. The dig was sponsored by the Wisconsin Archaeological Survey.

George I. Quimby, Chicago Natural History Museum, worked in northeastern Wisconsin during parts of May and July studying relationships of late Archaic sites to the Nipissing and Algoma stage beach levels of the Lake Michigan basin. In October he made an archaeological survey of portions of the Lake Superior shore.

Assembled by Warren L. Wittry

NORTHEAST

Several archaeological projects were undertaken during the summer by the National Park Service. A notable instance of the use of archaeology as a means for checking historical facts occurred at Fort McHenry National Monument and Historic Shrine, Baltimore, Maryland. Here G. Hubert Smith, on loan from the Smithsonian Institution, worked for a full summer and established with the aid of a carefully coordinated historical research program involving over 12,000 microfilm records, the true physical character of the fort at the time of the bombardment in 1814. The outstanding discovery was the location of the flagpole on which the enormous garrison flag, flown during the engagement and now enshrined in the National Museum, was sighted by Francis Scott Key on his notable sojourn aboard the British man-of-war in the harbor. Fragments of the flagpole base and certain fittings established the site designated by historical records.

At Hopewell Village National Historic Site, an 18-19th century ironworking community in southeastern Pennsylvania, Ronald J. Mason, working under contract with the National Park Service, uncovered the foundations of the casting and molding houses near the furnace as the first step in the reconstruction of these buildings.

Extensive archaeological tests were made in the area of the Great Redoubt and the American lines at Saratoga National Historical Park by John L. Cotter and by contract with Galen B. Ritchie. Sections of the American line were established but no physical trace of the Great Redoubt of the British, which was also the site of General Fraser's grave, could be located. Further work was done by Cotter at the Schuyler House at Saratoga National Historical Park, at Gettysburg National Military Park and Cemetery, and at Harpers Ferry National Monument.

Outside the National Park Service's activities, John L. Cotter also completed an archaeological investigation of the vicinity and grounds of Rockford, the home of General Hand at Lancaster, Pennsylvania, for the Junior League of Lancaster. Rockford will be restored and exhibited as a civic enterprise. This furnishes a notable example of increasing archaeological investigation called for by a desire for accurate historical reconstruction on the part of local historical societies and civic groups throughout the Northeast.

MASSACHUSETTS. The Cohannet Chapter of the Massachusetts Archaeological Society continued work for the third full summer at Assawompsett Lake, Middleboro, completely excavating an area 52 m. by 80 m. to an average depth of 1 m. Seven lodge floors of a plan entirely new to this area have been located. Excavations have been carried sufficiently beyond these floors in all directions to reveal the entire village plan. Four cremation burials were found to the south of the village proper. The approximately 1600 stone artifacts from this village indicate an Archaic occupation. The presence of steatite bowl fragments, grooved axes, cylindrical pestles, and a large number of small projectile points, together with the absence of pottery, suggest that the material belongs in the latter part of the period. Carbon samples have been submitted but the results are not available to date.

NEW YORK. Continuing with his settlement pattern studies in the Northeast, William A. Ritchie of the New York State Museum and Science Service, aided by three students, spent July and August excavating two major sites. Work begun in 1957 on the Bates site, Chenango County, was completed with the uncovering of an entire village of the Owasco culture. This pre-Iroquoian settlement was surrounded by an oval stockade, measuring approximately 96 by 55 feet, with a baffled entrance way. Within the stockade lines a corridor along either side of the village was found free of postmolds, while the central area of the enclosure was occupied by a postmold complex, apparently representing superimposed circular and oval houses. Ninety-five hearths and storage pits occurred in and around the house floors, as well as outside the palisade lines. The Bates site evidently represents a developmental stage of the Owasco culture prior to Castle Creek. Radiocarbon dates are forthcoming on samples from both seasons' work.

In connection with the pollen spectra studies of the New York State Museum, involving deep core borings of lake and marsh sediments in several parts of the state, Ritchie and his crew undertook limited excavations at the Lamoka Lake site, the type station of the Lamoka culture. Since initial excavations there most of the site has been dug over by amateurs, [illegible]t soil samples were obtained from a few undisturbed areas for pollen correlation with adjacent lake and marsh samples. Additional settlement pattern data were also secured.

Under a State Museum contract with the National Park Service, Ritchie surveyed during September within the proposed Allegheny River Reservoir in Pennsylvania. Don W. Dragoo of the Carnegie Museum of Pittsburgh also participated.

During the summer of 1958, the Niagara Frontier Archaeological Project, with headquarters in the Buffalo Museum of Science, began research on Indian sites in the Buffalo area. Excavations during July and August were sponsored jointly by the Project and the New York State Museum and Science Service. Marian E. White directed the field work, assisted by James V. Chism and William B. Roosa. The month of June was spent in relocating and recording sites which might require salvage work. At one such, the Kleis site, at Hamburg, Erie County, burials were being destroyed by house construction. Twelve burials, part of an extensive cemetery of a nearby Contact period Iroquois village, were excavated during July in the yard of one of the new houses. European trade goods accompanying these burials suggest a date of 1620-40 for the village occupation.

Excavations were carried on during August at the Oakfield site, a Transitional Iroquois village at Oakfield, Genesee County. Here a trench was cut through the earth bank surrounding the village to ascertain the construction and to test for palisades. Near the crest of the bank five holes, 5 to 11 inches in diameter, had been dug into the undisturbed subsoil. Several of these contained rocks which had probably served to brace posts. There

were no traces of the posts themselves. Further work will be necessary to establish the pattern of the palisades. Three longhouses were found partly superimposed on one another within the earth bank. One was completely excavated while the others were traced by test squares. All three were approximately 23 feet in width; one was about 60 feet in length, the second, about 80 feet, and the third, possibly incomplete, about 85 feet. Both ends of at least two of these houses appear to have been circular. A number of pits were found in and around the houses but all traces of lodge floors and fireplaces had been lost through cultivation. Estimates on the age of the site vary from A.D. 1200 to 1400. This is one of the earliest occurrences of the Iroquois longhouse.

Julius Lopez reports that following the recent demolition of an old mansion on Giles Place, west of Sedgwick Avenue, Bronx County, the New York City Archeological Group explored the property, and, after sinking various test shafts, located the ruins of Fort Independence over which the mansion had been built. Most of the initial work was done by H. Trowbridge. A small bulldozer was subsequently hired to remove the overburden and mansion debris. This is the first time that a power machine has been used in coastal New York for archaeological purposes.

Fort Independence was a two-bastioned earthwork built on Tetard's Hill in 1776 by the Pennsylvania militia, assisted by other troops. It was the largest fort in the Bronx but enjoyed no great triumph in American history. Events occurred so quickly during the British campaign in New York City that it fell soon after it was built. With the American positions collapsing everywhere throughout the area, the American commander was obliged to abandon the fort (October 28, 1776) after destroying the barracks. The cannon and 300 stand of arms fell to the enemy who reinforced the post and held it for three years after renaming it "Fort Number Four."

Only part of the fort lay under the Giles mansion property. The rest was destroyed years ago by construction on adjacent lots. The excavation is, therefore, incomplete. However the stone footings of two buildings were exposed, mapped, and photographed. The larger foundations indicated partitioned walls and back-to-back fireplaces. Construction was of roughly dressed stones (Fordham gneiss and other micaceous rocks), with the courses laid in clayey sand. Occasionally, bricks occurred in random layers sandwiched between the tiers. Most of the bricks are red, but a few, considered of Dutch origin, are yellow; these were probably salvaged from nearby farm dwellings destroyed during the war. Artifacts include: rum and medicine bottle fragments, some lead shot flattened into dice, cannon and musket balls, a burst mortar shell fragment, caltrops or three-pronged spikes to impede cavalry, flints. A cuff-link fragment with a portrait bust of Louis XV was recovered, as well as kaolin pipe pieces marked TD, WW, WG, a bowl with a heraldic lion and unicorn design, and military buttons of the 6th (or 9th), 17th, 35th, 37th, 44th, and 57th British regiments.

PENNSYLVANIA. W. Fred Kinsey, Pennsylvania State Museum, spent three weeks on the Ibaugh site in Washington Boro excavating a 16-foot square area adjacent to the work of 1957. Thirteen burials and two refuse pits were encountered. Twelve of the burials were normal, flexed Susquehannock interments of the Historic period dating about 1600-1625. The thirteenth burial was extended in the supine position and found below a flexed skeleton. The extended burial was probably one of the Shenk's Ferry community which was located here prior to the Susquehannock occupation.

Kinsey also excavated a portion of the Kent-Hally site in Upper Bare Island, Martic Township, Lancaster County. The major component of the site is a middle or late stage of the local Archaic. An early use of steatite is suggested.

WEST VIRGINIA. During the summer of 1958 the Carnegie Museum of Pittsburgh completed the excavation of the Cresap Mound (previously known as the Gatts Mound) 9 miles southwest of Moundsville. This project, under the direction of Don W. Dragoo, was jointly sponsored by Carnegie Museum, Hanna Coal Company, and the West Virginia Archeological Society. The Hanna Coal Company, on whose property the mound was located, bore the greatest burden of expense during the 13 weeks of work.

The Cresap Mound proved to be a highly productive Adena structure. Fifty-four burials, many with accompanying artifacts, were scattered throughout the mound from the top to below the base. The several layers of the mound present an excellent chronological picture of Adena development in the Upper Ohio Valley. The stratigraphy of this mound can be used as a key to the ordering of other Adena materials from the area. The Cresap Mound appears to have been begun early in Adena times and used for several centuries. The several carbon samples removed from the mound should be welcome additions to our lists of Adena dates. Many interesting objects including several Adena tablets, copper and shell beads, a copper gorget, slate gorgets and pendants, tubular pipes, blades, celts, and bone tools were found. Many samples of partially decayed organic materials have been removed to the laboratory for study.

James L. Swauger of the Carnegie Museum continued recording the petroglyphs of the Upper Ohio Valley.

The University of Georgia, jointly with the West Virginia Archeological Society, sponsored excavations directed by James H. Keller at the Mt. Carbon site in West Virginia. This is a stone fortification somewhat similar to some in Georgia.

ONTARIO. Last summer, the Royal Ontario Museum conducted one minor and three major field operations. Serpent Mound excavations were continued under the direction of R. B. Johnston, and to date over 60 human burials, including cremations, but very little cultural material, have been found. Parts of the shellheaps and of the village site have been explored, but the complete picture of the history of the site is still far from known.

Walter Kenyon, with a party of three, explored a

Woodland site, rich in pottery, on Cameron's Island, in Lake St. Francis (lower Great Lakes area). Affiliations have not yet been determined, but they probably lie with Point Peninsula, or closely related cultures. The site, unfortunately, was badly damaged by pot hunters.

Kenyon also excavated the mound on Pither's Point, just outside Fort Frances. Although badly eroded by the river, much of it remained, and there was no serious disturbance of the center. No burials were found, but a good deal of pottery (Black Duck), and a scattering of stone and other artifacts. Affiliations remain to be worked out, but they probably are late Siouan. During September, Kenyon investigated a palisaded village of the Glen Meyer focus, a Late Woodland occupation, near Toronto.

Selwyn Dewdney continued to record pictographs for the Royal Ontario Museum. He reports that the coverage has been greater than last year, the number and size of the complexes greater, and that several new ideograms have been recorded.

Assembled by ALFRED K. GUTHE

SOUTHEAST

Salvage archaeology, either governmental or private, was the major concern of most work in the Southeast during the summer of 1958. David DeJarnette from the University of Alabama and Moundville State Park excavated a stone mound on the Coosa for the Alabama Power Company. Burials were flexed at the periphery, extended in the central area. Pottery was plain with the exception of some incised of unknown affiliation. DeJarnette also reported discovery of an urn burial site west of Tuscaloosa. The urns were not associated with historic trade materials as was the case in central Alabama.

River Basin surveys were conducted by Robert Rands in the Pearl River Reservoir in Mississippi and by Douglas Schwartz at Buckhorn, Barkley, and Rough river reservoirs in Kentucky. Schwartz also made an extensive survey of the Mammoth Cave area for the National Park Service. He reports that Indian occupation of the Park area climaxed during the Early Woodland period around 300 B.C. The University of Georgia began excavations under Stuart Neitzel in the Hartwell Reservoir in northeast Georgia. This region was the lower Cherokee area during the historic period.

Carl Miller excavated at two sites in the Hartwell Reservoir in Georgia and South Carolina and conducted additional survey in the reservoir area. River Basin Salvage plans for the Ft. Gaines Dam on the Chattahoochee in Alabama and Georgia are well under way. The region involves a number of interesting sites from the Archaic through the historic periods.

The University of Texas worked in the Ferrell's Bridge Reservoir in the Caddoan area with an 11-man field party under E. Mott Davis and W. A. Davis. The smallest mound, excavated by the National Park Service in 1957, contained a single burial associated with Titus focus. One mound, at least, contained a burned circular house. The Jake Martin site nearby was the first detailed excavation of an Archaic site in that area. It yielded Yarbrough, Gary, and Wells points, with a few Meserve and San Patrice points.

Historic archaeology was an active field during the summer months in the southeast. Hale G. Smith excavated in St. Augustine for the St. Augustine Historical Society in a coordinated project involving documentary research under Charles Arnade. The objective was to define the period in which the Society's property was built.

John Goggin continued excavations at Oven Hill, a Seminole site on the Suwannee in Florida.

Joel Shiner virtually completed the planned excavations at Ft. Frederica National Monument on the Georgia coast, while at Wilmington, North Carolina, the State Department of Archives and History is beginning the excavation of Old Brunswick Town. This will eventually be an exhibit of excavated remains without restoration. Peter H. Kunkel has been employed to supervise the excavation of Ft. Loudon in Tennessee. This will, it is hoped, result in a restoration. Many of the soldiers from Ft. Frederica later served at Ft. Loudon.

Carol Irwin is studying the material at Ocmulgee National Monument relating to the historic Trading Post there. This is part of a larger project on the historic period throughout the southeast.

GEORGIA. At Etowah Mounds, Georgia, two projects went on during the summer. Lewis H. Larson, Jr., continued excavation of Mound C, originally excavated by Moorehead. He found extensive postmold patterns in the core mound and below it. A. R. Kelly conducted the fifth summer session at Etowah. His excavations continued in the heavily stratified area adjacent to Mound B. In addition, the work on the permanent museum is well under way. A. R. Kelly and Clark S. Knowlton excavated a shell midden near Sylvania, Georgia, with a prepottery zone of the well-known Brier Creek flint material of Archaic type.

FLORIDA. W. H. Sears excavated for the Florida State Museum a burial mound of probable Late Weeden Island date in St. Petersburg. The mound was being razed for construction. Over 100 burials were excavated. All were in an unusually good state of preservation. This is perhaps the largest prehistoric skeleton collection from Florida.

KENTUCKY. The Museum of Natural History at Covington reports excavation of the Gaines Mound and an extensive survey program in the Covington area.

OKLAHOMA. James B. Shaeffer of the Oklahoma Archaeological Salvage Project worked during the summer at a large late Archaic site in a roads material area in Latimer County, southeastern Oklahoma, and found storage pits, postmolds, and numerous artifacts. All were under a carpet of sandstone rocks which are believed to be bases for a pattern of roof supports of a large, lightly gabled structure.

A radiocarbon date of A.D. 700-900 has been obtained at the Humble Radiocarbon Laboratory from a sample

from the McCarter site, an Archaic site near Muskogee (see *Bull. Tex. Arch. Soc.*, Vol. 28, pp. 240-68) much like the Latimer County site. The specimen is from a latest Archaic or earliest ceramic context. The date suggests that Caddoan beginnings may have been more recent than many (but not all) Caddoan archaeologists have felt.

The summer field school of the University of Oklahoma, directed by Robert E. Bell, worked at the Fort Gibson Reservoir on the Grand River north of Muskogee. The main work was devoted to final salvage excavations at the Harlan site, Ck-6, which had seen earlier work in 1949-50 before the reservoir was built. Since then much of the site has been destroyed. The 1958 work was directed at the two remaining mounds, Units 6 and 7. Unit 6 was a small oval mound about 65 feet across and 5 feet high, which appears to have been built for the sole purpose of burying the remains of a square house with four large center posts and a trench-type entryway, characteristic of Gibson aspect Caddoan structures. The mound fill contained very little except for occasional Williams Plain sherds.

Unit 7 was a flat-topped rectangular mound about 160 feet across and 14 feet high. It had four construction phases, the first one a low circular mound built over the remains of a house (or perhaps two houses) in the manner of Unit 6, and the others flat-topped mounds without postmolds or other structural evidences. Each mound platform was probably a ceremonial area rather than the base of a building. Artifacts were scarce except for occasional Williams Plain sherds.

A hitherto unknown rock mound complex was studied briefly in the upper part of the Fort Gibson Reservoir area. It had first been noted by Clarence R. Martin of Tulsa. The mounds are from 10 to 40 feet in diameter and 1½ to 5 feet high and occur in groups, usually in a row along the crest of a ridge. One mound was tested and found to contain nothing but rocks and soil, with numerous flint chips, a few broken flint artifacts like those of Early and Middle Woodland horizons in northeastern Oklahoma, a pitted stone, and two small fragments of charcoal. There is no indication of the original purpose of the mounds.

A reconnaissance of the Short Mountain Reservoir on the Arkansas River in Eastern Oklahoma was conducted by A. Dewey Short, sponsored by the University of Oklahoma, the National Park Service, and the Corps of Engineers. Several important sites were found and excavation is anticipated.

(Other work in Oklahoma is reported in the Plains section of Notes and News.)

Assembled by CHARLES H. FAIRBANKS

MIDDLE AMERICA

TAMAULIPAS. H. B. Nicholson of the University of California at Los Angeles, assisted by Mr. and Mrs. Rudolf Troike and Thomas Walsh of the University of Texas, excavated July 17 through August 9, at one of the largest sites in the Sierra de Tamaulipas. Known locally as "Laguna de Moctezuma," it is located on the property of Rancho Acuña, owned by Clint Murchison of Dallas who generously provided full facilities to aid the work. The site, representative of one major occupation phase within MacNeish's Pueblito tradition, consists of over 1400 circular house platforms thickly scattered over the top of a large mountain. The most interesting single feature of the site is a masonry ball court, possibly the northeasternmost in Mexico, which was cleared and mapped. A series of pits and trenches in and around various of the house platforms produced a huge quantity of sherds, the majority simple monochrome domestic ware. In addition, in refuse associated with the tallest structure at the site, which possibly served a ceremonial function, a reconstructable cylindrical tripod vessel and a number of fragments of vessels of similar type in indubitable Teotihuacanoid style were found, strongly indicating a Classic date for the site. Three other smaller but similar sites on the ranch property were inspected and surface collections made. Located in a key cultural transitional zone between the high culture Mesoamerican Huaxtec area to the south and the "cultural sink" of northeastern Tamaulipas and southern Texas to the north, the Sierra de Tamaulipas, which MacNeish has investigated so vigorously, offers significant archaeological potentialities for those interested in problems of contact between culturally distinct regions.

QUERÉTARO-GUANAJUATO. The Logan Museum of Beloit College sponsored a joint archaeological-social anthropological expedition in the Querétaro region from February 9 to May 30. While eight students worked with Andrew H. Whiteford on a study of the city of Querétaro, nine students under the direction of William S. Godfrey, Jr., made an archaeological reconnaissance of the area, part of the fertile Bajío district, during which over 40 sites were located. One site, La Magdalena, in neighboring state of Guanajuato, was excavated. It consists of three courtyards surrounded by pyramids and platforms arranged along an approximate east-west axis. Attention was focused on the most easterly courtyard, where a number of unmortared stone constructions, comprising at least three sequent building stages, were revealed, including a colonnaded room. Two tons of sherds were recovered. Preliminary studies indicate that the ceramic assemblage of La Magdalena affiliates with the early phases of Tula; certain Michoacán ties also seem to be present. Further work at the site is planned. This project may eventually throw significant light on the problem of Toltec presence or influence in the areas northwest of Tula.

OAXACA. Mexico City College conducted its sixth season of work at Yagul, from January to March, under the direction of John Paddock, assisted by four graduate students and two undergraduates at the college. Departing somewhat from previous procedure, a zone was selected which seemed likely to yield data on the domestic pattern of life surrounding the ceremonial center. An area approximately 30 by 40 m. on a small terrace was

almost completely excavated, with rewarding results, including the first finds of Yagul of whole Monte Albán I objects in situ and a much re-used Monte Albán V period triple tomb. The most spectacular discovery was a large Monte Albán III-b period tomb in another area. Although its contents had been violated in ancient times, glyphic carvings on the door slab and on lintels spanning the outer and antechamber doorways provide invaluable new epigraphic data of Monte Albán tradition. These inscriptions as well as other photographs of the 1958 field season have been illustrated in Number 5 of the *Boletín de Estudios Oaxaqueños*, a new series published by the recently founded Centro de Estudios Regionales of Mexico City College in the city of Oaxaca.

The Mexico City College group also conducted its usual summer field methods course, six weeks of which were spent in Oaxaca. Eight days of excavation and consolidation were devoted to an important new Monte Albán I site near Yagul, Caballito Blanco, a low meseta just off the highway between Mitla and Tlacolula. The site consists of three low stone-faced mounds in a ceremonial patio arrangement, together with abundant surrounding house remains. The ceramics are presently being studied, and further investigation of the site promises to add to our understanding of the Late Preclassic in the Valley of Oaxaca.

CHIAPAS. The New World Archaeological Foundation has added to its staff J. Alden Mason, who, in addition to serving as editor, will also spend the winter months in Chiapas. Mason joined the field party in March of 1958 and directed architectural investigations in three mound complexes at Chiapa de Corzo. Data recovered pertain primarily to the Early Classic period, but the mounds in each instance were found to have core structures of earlier date.

Carlos Navarrete and Pierre Agrinier continued excavation and consolidation of Mound 1 at Chiapa. Additional buried structures were located and cleared within the body of this late Preclassic stone-faced platform. The most important recent discovery is Tomb 7, located beneath the surface of the earliest structure within Mound 1. The 33 pottery vessels constituting the ceramic offering include outstanding trade pieces from Central America, the Gulf Coast, and Oaxaca. Navarrete has also excavated large sections of early occupation areas in the vicinity of Mound 1, adding greatly to the catalog of objects and features pertaining to the Chiapa I, II, and III periods, which correspond to Early Chicanel and earlier levels. Bruce Warren has recently commenced uncovering 2 m. of occupational debris known to be beneath the Mound 1 plaza. This continuing program of stratigraphic excavation has permitted refinement of the sequence of ceramic periods at Chiapa, and it is expected that it will soon be justifiable to publish a reliable ceramic column with named phases.

Navarrete also made brief investigation of a previously looted stucco pyramid located at Juan Crispín, just west of Tuxtla Gutierrez. A burial cleared in the center of the heavily stuccoed earthen platform was accompanied by an important offering of seven pottery vessels, a pair of large jadeite earflares, and a tubular bead of outstanding workmanship. All evidence indicates that the Juan Crispín structure dates to the general Chiapa III or Early Chicanel period.

Work at the Upper Grijalva site of Santa Rosa in the Municipio of La Concordia was directed by Augustín Delgado, with Donald and Lolita Brockington assisting. A series of 29 test pits was excavated across the site, and exploratory trenches were dug in 12 of the 26 mounds. Major occupation was in the late Preclassic period. A thin but widespread Late Classic occupation shows a Petén Maya aspect, in keeping with the pattern characteristic for the Upper Grijalva at this time. Brockington is now engaged in analysis of the huge Santa Rosa sherd collection.

William T. Sanders spent six weeks testing and mapping at the site of Santa Cruz, 6 km. upriver from Acalá. The Acalá ceramics appear to support the Chiapa de Corzo sequence, but with the added advantage that the more extensive late occupation at Santa Cruz will permit considerable upward delineation of the ceramic stratigraphy for the Chiapas Central Depression. An undisturbed Postclassic site with house foundations still intact was located near Chiapilla, across the Grijalva from Santa Cruz, and it is expected that the town plan and sherd sample from here will provide important data for understanding the final pre-Conquest period.

A survey of the caves and surface sites located in the Ocozocoautle and Cintalapa region has been completed by Fredrick A. Peterson. Pottery was found in the caves in abundance, mostly gray or black ware with geometric incision, known to date from the Early Classic period. Many mound sites, representing various periods of occupation, were sampled. The most interesting was El Mirador at Vicente Guerrero. Apparently occupied from late Preclassic into Early Classic times, this site yielded an abundance of slab-legged vessel fragments and late Preclassic figurines, neither of which figures prominently in contemporary ceramics at Chiapa de Corzo and other sites in the Grijalva Valley.

Three sites in the environs of Juchitán, Oaxaca, were tested by Agustín Delgado in July in a successful attempt to tie in the ceramics of the Chiapas Central Depression with those of the Isthmus. Delgado spent August investigating the Mixtec site near Xadani, south of Juchitán, where seasonal rains were eroding a huge late occupational area, revealing objects of copper and gold in addition to numerous burials. The practice of local residents to work the area in search of saleable antiquities and the destructive action of rain and lagoon waters make it urgent that a systematic study be made in the near future.

In 1959 the Foundation will place major emphasis upon clearing of extensive occupation areas at Chiapa de Corzo in an attempt to round out our knowledge of the earliest Chiapas culture periods. It is possible that some further work will be done in the Isthmus region or at Izapa near Tapachula, although the latter project may await a major effort to be made the succeeding year.

YUCATÁN. Loring M. Hewen, who has made a number of trips to Cozumel Island to examine archaeological sites, and who has explored the east coast of Yucatán southward to Tulum, has very kindly offered to supply prints from his extensive and excellent photographic collection to any scholar who may want them for study or illustration. His collection covers, in addition to several Cozumel sites, the sites of Tulum, Xcaret (Pole), Punta Piedra, Paamul, Xelha, Ac, Tancah, and a number of small unnamed sites on the coast. There are also numerous photographs from Chichén Itzá and from the Puuc, including Uxmal, Kabah, Sayil, Labna, and some outlying groups. The photographs include color as well as black and white. Communications should be addressed to: Loring M. Hewen, 51 East 42nd Street, New York 17, N.Y.

GUATEMALA. Stephan F. Borhegyi again conducted classes in archaeology and ethnology at the summer session of San Carlos University in Guatemala, aided by grants from the Bollingen Foundation of New York and the Faculty Research Council of the University of Oklahoma. Borhegyi and 16 of his students worked at Lake Amatitlán, where a group of amateur skin-divers continue to recover large numbers of vessels including many elaborate incense burners. Two new locations of underwater offerings were discovered and explored: one late Preclassic, the other Late Classic. Material with strong Teotihuacán influence from the site of "Lavaderos" was studied in the private collections of Jorge Castillo and Guillermo Meta Amado. A Tlalco jar from the same site, found by James Kitchen, contained liquid mercury with cinnabar, graphite, and nearly 400 fragments of what appeared to be jade earspools. Others recovered a stone yoke, fragments of mushroom stones, and stone figures sculptured in cross-legged seated pose. Borhegyi sees in these sculptures a similarity to those of the Cotzumalhuapa region, and raises the question of an early Pipil migration into Guatemala.

Assembled by TATIANA PROSKOURIAKOFF and H. B. NICHOLSON

HIGHLAND SOUTH AMERICA

CHILE. In the provinces of Atacama and Coquimbo the staff of the Museo de La Serena, under its new Director Jorge Iribarren Charlín, together with members of the Sociedad Arqueológica of the same city, excavated several burials of the El Molle culture, in the valleys of Huasco and Copiapó. In the latter, several Diaguita sites were discovered. Hans Niemeyer, also of the Sociedad Arqueológica, made a survey of a fortress-like architectural complex at Punta Brava. Jorge Iribarren and Mario Segovia report on their survey of the region of Almirante Latorre, 80 km. from La Serena, where new petroglyphs and an Incaic mining site were found. Greta Mostny of the Museo Nacional de Historia Natural, Santiago, and Jorge Iribarren also discovered a new site of the Piedras Tacitas culture at Totorita in the Valle de Elqui.

In the provinces of Santiago and Valparaiso, Francisco Fonck, of the Sociedad Arqueológica, is working on the preceramic cultures of the coast. His recent discoveries near Quinteros seem to substantiate the relationship of this complex to the Piedras Tacitas culture, postulated at Las Cenizas. Father Gustavo Le Paige's work in the provinces of Tarapacá and Antofagasta continues and an extensive report is forthcoming.

ECUADOR. From January to April, 1958, Emilio Estrada, Director of the Museo Arqueológico "Víctor Emilio Estrada," Guayaquil, carried out stratigraphic excavations in three major regions of the Coast of Ecuador: La Libertad on Santa Elena Peninsula, the Ayangue Bay area in the Province of Guayas, and Machalilla, on the south coast of Manabí Province. From the numerous stratigraphic cuts in each site and tens of thousands of sherds, Estrada has demonstrated that the La Libertad and Ayangue sites are good examples of the Chorrera period (Formative) in Coastal Ecuador. The Machalilla site shows certain ceramic characteristics that relate the culture to Late Valdivia and Early Chorrera periods.

From August to mid-September, 1958, in collaboration with Emilio Estrada, Clifford Evans and Betty J. Meggers of the Smithsonian Institution conducted field work in several regions of Coastal Ecuador. They made excavations and ran a survey along the coast and in the islands of Jambeli in El Oro Province. Here the large shell middens in mangrove swamps produced pottery showing relationships to cultures on Puna Island and to those in southern Guayas Province. Nothing related to the Formative period was found and, although the pottery analysis has not been made, these new finds suggest another example of the "Período Desarrollo Local" established by Estrada. On the mainland slightly inland from the mangrove swamp area, mounds of the Quevedo-Milagro period were found.

Further excavations were carried out in the Province of Los Ríos in the area around Quevedo, looking for data that would clearly define local or temporal differences in the Quevedo-Milagro period as now defined. The region covered contains many mounds with the village pattern and ceramics typical of this period.

In order to establish more specifically the relationships between the Chorrera and Tejar periods, stratigraphic excavations were conducted at the site of Naupe on Río Daule, Province of Guayas, to see if any regional differences occur in sites of this period on the Ría Babahoyo, Río Daule, and the coast of the Province of Guayas.

Through the efforts of the UNESCO mission in Quito a museum for anthropology, and more especially archaeology, has been established by the Salesian Order to gather together materials from their various missions in the interior of Ecuador.

PERU. The archaeological project of the Instituto de Arqueología y Etnología of the Universidad Nacional Major de San Marcos is now going into its second year. Dwight Wallace, with Ica as his base, is continuing his work in the Chincha-Pisco area. Gary Vesalius is leaving shortly for a survey of the Chala-Tacna area with its

original base at Camaná, and Paul Tolstoy, continuing David Kelley's far north coast survey begun last year, is already working out of Piura. The material from last year's work is now being worked up and correlated at the San Marcos University Museum, and several preliminary findings are already in publication.

The new museum at the site of Puruchucu, 11 km. east of Lima, was scheduled to open the 15th of October. Puruchucu itself is a small, self-contained site, typical of the epoch of Kingdoms and Confederations on the Central Coast, which was recently restored by Arturo Jimenez Borja. The accompanying museum has been designed to contain archaeological and physical anthropological specimens from this and similar excavated or restored sites in the vicinity of Lima. The initial collections include those from Puruchucu itself and the adjoining Huancho site of Encalada, those from the recent Ministry of Education excavations at the Vásquez site near La Molina, and those excavated by Louis M. Stumer at the Huaquerrones site on the Hacienda Vista Alegre. Jimenez Borja's work of excavating, cleaning, and restoring the Huaca Pan de Azúcar in San Isidro, Lima, is continuing with the cooperation of the Dirección de Arqueología e Historia and the Municipalidad de San Isidro. A rather long continuous occupation has been disclosed, with a part, at any rate, of the construction of a huaca dating from the Maranga culture, the latest specimens being of the Inca-associated style. Unusual and noteworthy is the relatively high incidence of specimens imported from or imitative of the late periods in the Cañete and Chincha valleys.

The second National Historical Congress, held at Lima, ended August 9th. The Congress was devoted to the pre-Columbian period and therefore there were present a good number of non-Peruvian anthropologists and archaeologists, both North American and European. The Congress concluded with a visit to current or recent archaeological excavations in the vicinity of Lima and another to the fortress of Paramonga and archaeological sites en route.

Assembled by G. REICHEL-DOLMATOFF

ANNOUNCEMENT OF THE ANNUAL MEETING

The 24th Annual Meeting of the Society for American Archaeology will be held April 30, May 1 and 2 at Salt Lake City, Utah, with the University of Utah as host institution. The formal sessions will meet in the University of Utah Union Building; arrangements are being made for accommodations at the Utah Hotel. Special activities include a tour of the University of Utah Press, printer of AMERICAN ANTIQUITY, and on the last day of the meeting, a field trip on the late Pleistocene and recent geology of the Salt Lake region conducted by Daniel J. Jones of the University of Utah Geology Department.

James H. Gunnerson is Program Chairman, Dee Ann Suhm, Chairman of the Local Arrangements Committee. Send titles of papers to be presented at this meeting and brief (100 to 200 words) abstracts before April 1, 1959, to: James H. Gunnerson, Department of Anthropology, University of Utah, Salt Lake City 12, Utah.

The 25th Annual Meeting of the Society for American Archaeology will be held in the spring of 1960 at New Haven, Connecticut, with Yale University the host institution. The Executive Committee hopes to be able to continue to select the meeting place two years in advance. Members are advised that the attendance at the Salt Lake City meeting will strongly influence the Executive Committee in its consideration of future meeting places in the far west.

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HEIZER, R. F. AND FRANKLIN FENENGA
1939 Archaeological Horizons in Central California. *American Anthropologist*, Vol. 41, No. 3, pp. 378-99. Menasha.

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